NATURE MAGAZINE
VOLUME 31 · APRIL · 1938 · NUMBER 4

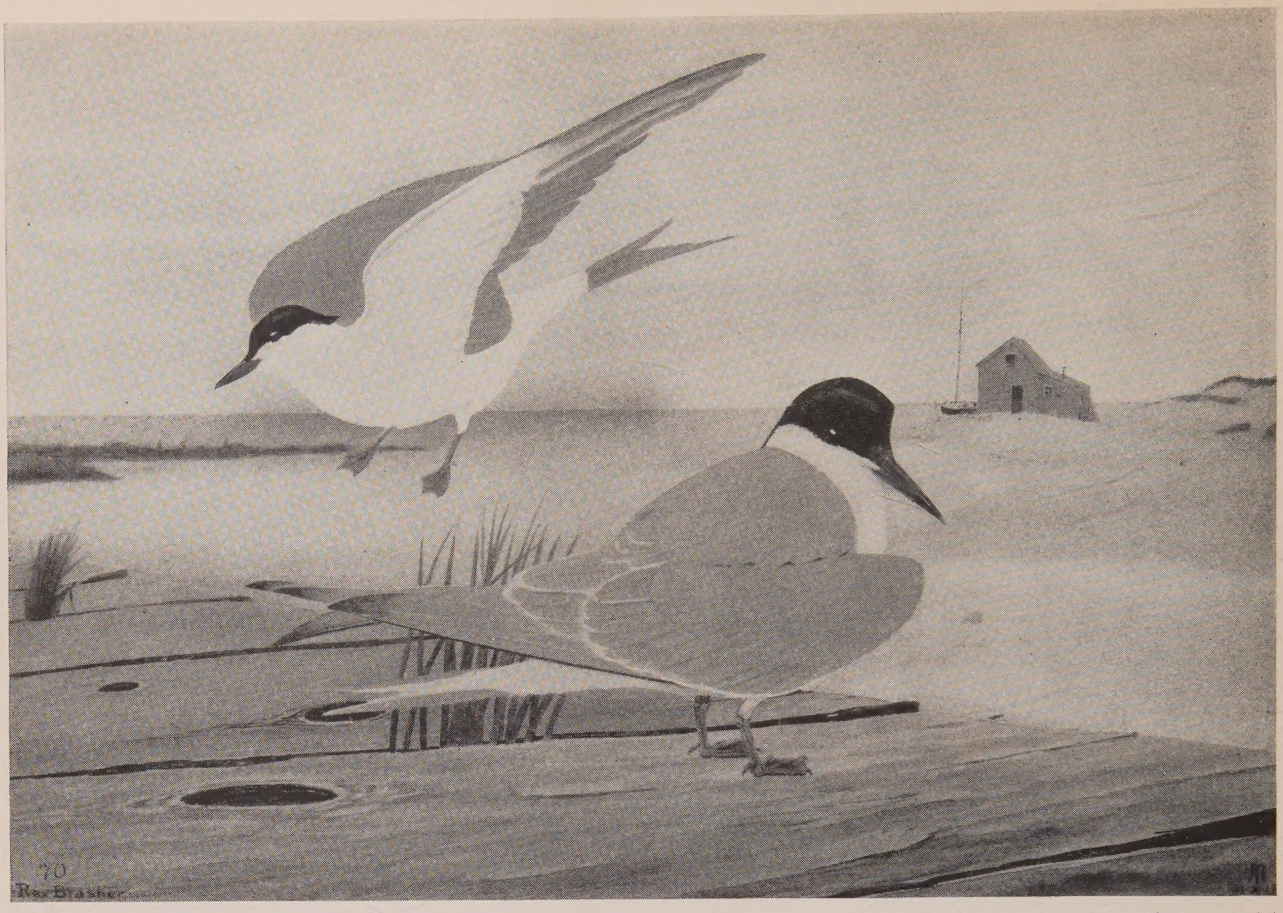
A flight of brant drop in to rest and feed on a little pond in the marsh before moving on to their winter home. This and the other three illustrations in this article are reproduced from the hand-colored subjects by courtesy of Rex Brasher

"I'll paint them—every one."

By LUCY SALAMANCA

ALMOST half a century ago a little boy from Brooklyn, New York, used to play hookey from school occasionally to lie all day in the bogs and marshes of Long Island watching the birds whirling and dipping overhead or picking their dainty ways amidst the reeds and rushes of the flats.

The boy's father, Philip Marston Brasher, was an amateur ornithologist, and had a collection of birds. For him, in 1841, the ornithologist Giraud had named a warbler, *Muscicapa brasierii.* It belongs to a genus of the tropics whose northernmost race, now known as *Basileuterus culicivorus brashierii,* inhabits northeastern Mexico. Brasher and the boy Rex had been accustomed to taking long walks together searching out different species of feathered folk or discussing the shortcomings of the paintings Audubon had left to posterity. The father pointed out to his eager listener that, while Audubon had bequeathed a valuable and worthy heritage in the 435 bird plates he had exe-



Common terns, whose alertness, combined with protection by man, is bringing them back toward their former numbers. Their graceful beauty adds life to the wide stretches of lonely beach and sea

cuted during his lifetime, he had sometimes sacrificed exactness for dramatic pose or effective coloring. He commented on the fact that North America had no complete pictured set of its birds. Ten-year-old Rex, looking up at him, quickly said, "Well, I'll paint them—all the birds in North America."

The extraordinary part of this story is that Rex Brasher carried out that boyhood resolve. And when he had completed 874 original paintings, after almost forty-five years of wanderings and study, he threw in, for good measure, execution of a limited edition of one hundred, with twelve volumes to each set, thus setting himself to paint by hand 90,000 plates. This stupendous task has but recently come to a close, and Rex Brasher, laying down his brushes, takes a meditative pull at his pipe as he says, "The hardest jolt was when I knew I had finished."

For fifty years this sixty-nine-year-old man has dedicated his life to birds, and he leaves now a set of paintings of North American birds that has been acclaimed as superior to any previous similar work, surpassing in number and accuracy the contribution of the famed Audubon himself. The 874 original paintings in water color include practically all of the 768 major species named in the American Ornithologists' Union check list of North American birds, and many additional sub-species. The numerous color differences, illustrating plumages resulting from age, sex, or season, bring the total number of figures up to 3000. Ninety per cent of these are life-sized figures and there are details such as rictal feathers, scutellation of the legs, the shape of bills and claws, and the delicate coloring about the eyes. After his many years of wandering field work, Rex Brasher brought his sketches to the American Museum of Natural History in New York to verify the details of his own productions, so that his finished pictures are scientifically exact as well as artistically satisfying.

The extraordinary skill with which this talented artist has caught the bird posture, the tilt of the head, the flirt of the tail, and other characteristic attitudes, makes his collection one of never-ending delight. Every little feathered creature seems about to take wing or to alight, or starting to do some one of the countless things that make up the varied and exciting life of a bird. The birds are painted against backgrounds where Rex Brasher found them; in marshes, winging across the sea, perched on twigs or bushes, quarrelling over chestnuts, resting—downy and white—upon the snow, dipping or soaring across monotonous flats, or resting quietly within the shadow of a friendly bush. The figures do not stand out aggressively against sky or foliage, but melt unobtrusively into their background as do birds in Nature.

Their very moods are caught and held, so that each painting strikes one with a new delight. Here are gay birds, pensive birds, truculent birds, tender and wistful birds, courageous birds, conceited, self-assertive birds and modest, unassuming little warblers. One knows in

Masked Bobwhite of southern Arizona. The males are confiding, handsome little fellows with the same cheerful call as our Eastern Bobwhite. The females are quite similar to Lady Bobwhite

an instant that only a man who has actually lived with the birds and shared their myriad habitats could possibly produce such compelling, living representations.

This, of course, is the secret of the charm and distinction of the Brasher achievement. Rex Brasher gave his life to study of his feathered friends and knows them, possibly, better than any living ornithologist. He has followed them from the farthermost northern regions to the tips of our North American tropics. He has lain for hours in marshy swamplands, stood knee-deep in icy bogs, shinned up tall trees, crouched hidden for hours in leafy foliage, to observe them. Everywhere on his travels he carried with him notebook and pencil and kept voluminous journals, jotting down any observation that struck him as interesting or enlightening. The result is the collection that today bears his name and which, it is hoped, will become a national possession in charge of the Library of Congress, through the beneficence of some private individual or otherwise.

It is natural that in the course of his study and observations Rex Brasher should have noted things of unusual interest to the Nature lover everywhere, and that he should have observed many fascinating things, experienced many unique and enthralling events. Added to his great zest for Nature itself is the power to express himself in homely, charming phrases, to describe with vividness and singular pointedness those things he saw and felt and heard. Hence his limited edition of bird plates is accompanied by explanatory text rich in the flavor of the outdoors, flecked with the tang of the sea and marshlands, and piquant with reminiscences that could only be the heritage of a man who has looked on life in a kindly, appreciative mood.

In all his wanderings over the North American continent, Rex Brasher had to concern himself also with earning his livelihood. Although without funds other than those he managed to earn at odd jobs, so determined was his resolve to complete the task he had set for himself that he allowed no human considerations to stand in his way. He did not, like most men, shape his life to the conventional pattern; he took no time off for marriage and home building or the establishment of any lucrative enterprise. He had set out to discover and paint all the birds in North America and he held to his objective through the years.

He picked berries in season, worked on the roads, or in the fields at harvest time, and for three seasons sailed out of Gloucester, signed up with a fishing crew. This he found an ideal period, for he was earning money and observing birds at the same time. Once, through a curious turn of fortune, he found himself possessed of a considerable sum. With part of this money he bought an old farmhouse in what he called Chickadee Valley, near Kent, Connecticut. Brasher assured himself, by this purchase, of a retreat where he might finish the great work he had undertaken.

Canada geese. "They are altogether admirable," says Rex Brasher, "and I am glad the old shooting mania has long since left me. To lure them to destruction with anchored live birds always seemed a lowdown trick."

Brasher had earlier proved himself an exacting taskmaster. In the first years of his undertaking he had made altogether about four hundred paintings of birds but, dissatisfied with the technique, or for some other reason considering that they fell short of his ideal, he destroyed them all. In one gesture he burned the painstaking labor and effort of years.

Thus, when he sought out the Kent farmhouse it was with the resolve that every finished painting should measure up in standard to his own idea of perfection. Painstakingly he labored and the result was 874 original paintings, containing 3000 bird figures. When the last was finished the State of Connecticut sent a representative down to the modest cabin in Chickadee Valley.

"See here," this representative declared, "this collection is priceless. It represents a life's work. It's altogether too valuable to be housed carelessly in this farmhouse in this fashion. Let the State of Connecticut have the collection and we'll build the finest museum of its kind in the world to house it."

So Rex Brasher, interested only in making his beloved birds available to the public, turned the entire collection over to the State of Connecticut. There was one stipulation, however, in his generous offer. If the museum for housing and displaying the pictures were not completed within two years, he could reclaim the collection.

Plans were drawn up for a most unusual museum building, with extensive wall space. But time went on, and funds for completion of the project were not forthcoming. After two years of waiting, Brasher reclaimed the collection, and for the first time permitted it to be shown in public exhibit. This exhibit was an outstanding success, thousands visiting the National Geographic Society building in Washington during the two weeks the birds were on display. So great was the interest attached to the exhibit, in fact, that Major Philip Brasher, nephew of the artist, was asked to extend it for still another week to permit everyone to enjoy the wonderful Brasher birds. Indeed, so great has been the interest aroused that it has been suggested that a museum, similar to that designed by the State of Connecticut, should be erected in Washington, possibly on the Mall, where the collection would be kept permanently as a national treasure, available to all who wish to study or merely enjoy.

Despite the arduous and lengthy labor Rex Brasher did not consider his life work finished with the completion of 874 paintings. He wished to make a special edition of the plates, with explanatory text, so that schools and colleges, ornithologists, or private individuals who love birds, might profit by possession of such volumes. Therefore he decided at first to get out five hundred sets of such an edition, with twelve volumes to each set.

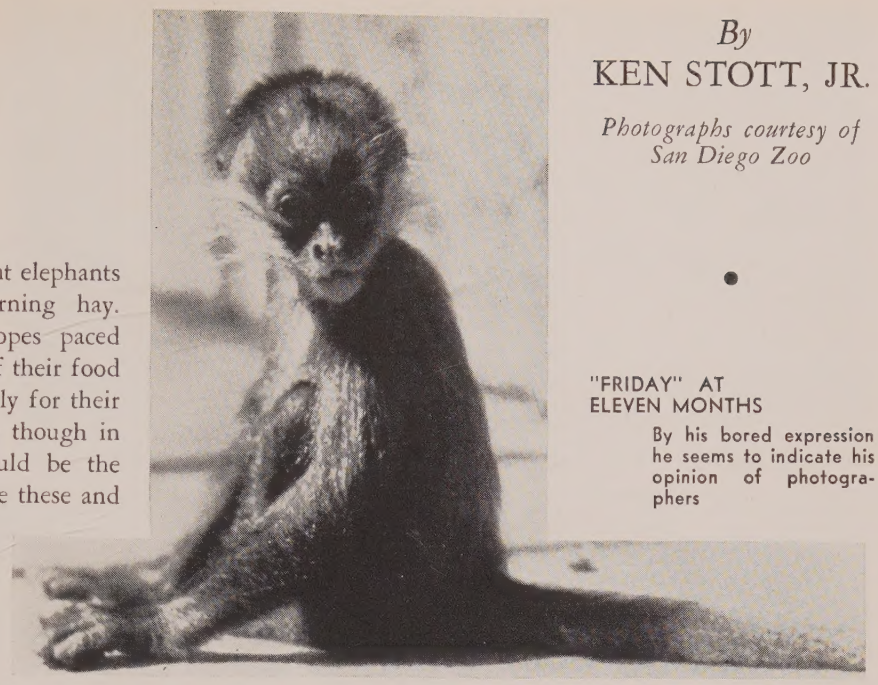
Publishers told him, however, that it would cost at least a half million dollars to produce plates for such an edition. "Very well," said Brasher, "I'll paint the plates myself."

(Continued on page 247)

The Spider Monkey

By
KEN STOTT, JR.

Photographs courtesy of San Diego Zoo



"FRIDAY" AT ELEVEN MONTHS

By his bored expression he seems to indicate his opinion of photographers

WITH shrill squeals, indignant elephants trumpeted for their morning hay. Graceful deer and antelopes paced restlessly back and forth in front of their food trough. Peacocks clucked impatiently for their grain. Fierce jungle cats roared as though in protest against neglect. What could be the cause of this negligence? Of course these and other wild residents of the zoo were not able to understand the bits of conversation that drifted across the still morning air from the monkey mesa. They could not know that the first baby spider monkey to be born in captivity had made its appearance in the monkey house of the San Diego Zoo.

Officials, keepers and scientists were crowded in front of the spacious cage, staring in silent wonder at this Geoffroy spider monkey baby. There was no doubt that the tiny primate had been bred in captivity because his mother had been in the San Diego zoo for more than four years. His birthday being Good Friday, 1935, Mrs. Belle Benchley, San Diego Zoo director, decided to name him "Friday."

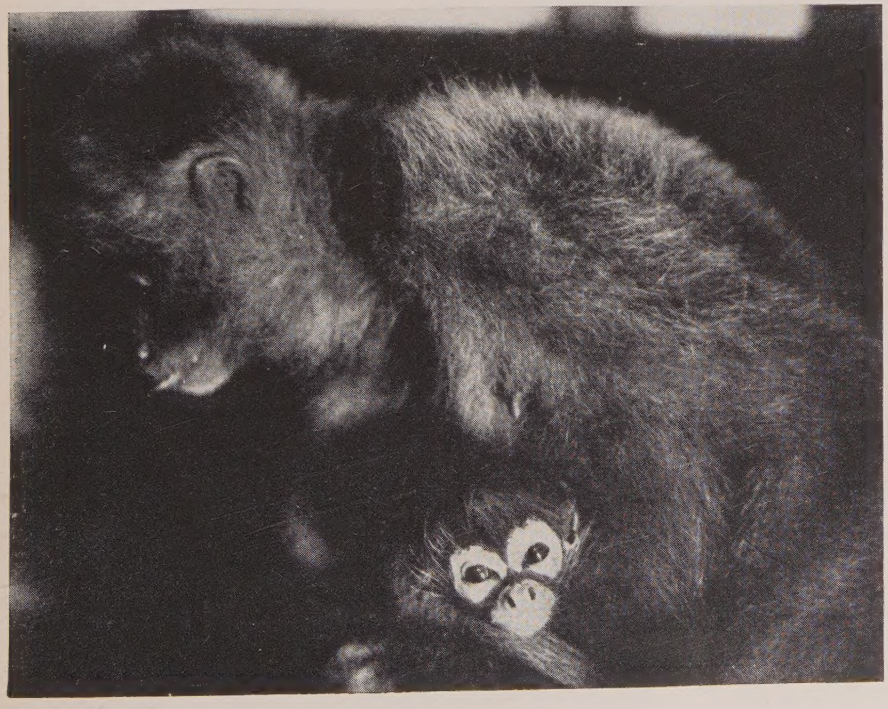
During his first few days he received so much attention that he was soon thoroughly spoiled. When left unnoticed for any length of time, he cried beseechingly in spite of his mother's efforts to quiet him.

Friday grew at an amazing speed and was soon swinging about the sunny cage with his proud mother. He quickly outgrew his interest in strangers and now pays little attention to any except those carrying paper bags that suggest peanuts.

Five months after the birth of Friday, another "spider" was born, and in November, 1937, the same mother had one more healthy baby.

There is certainly reason for the popular name of these South and Central American primates. When they swing their furry bodies about by those long, prehensile tails, they suggest large spiders. In form, they look much like the agile gibbon apes. Their long, hairy arms and legs are quite similar to those of their Asiatic cousins, but there the similarity ceases. Their tails, by which they are able to swing and hang, are slender and their heads are covered with a heavy growth of hair that comes to an erect crest. The hairless areas of wrinkled, pink flesh around the beady black eyes, thin-lipped mouths, and slanting nostrils of the young monkeys give them a startling resemblance to a black-face comedian.

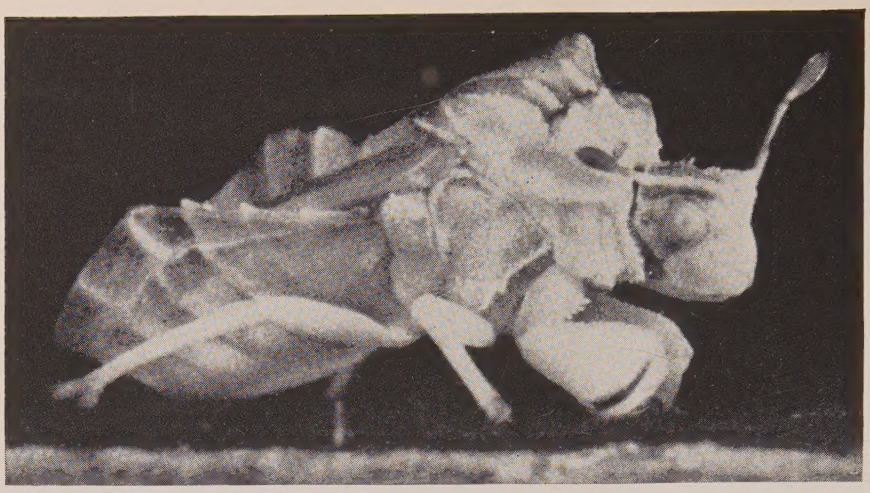
Because of the simplicity of their internal structure spider monkeys lack some function necessary to exist in captivity, and few zoos have been able to maintain them. The group in San Diego are shown in an attractive, outdoor cage equipped with pools, rock ledges, bars and swings that provide them exercise.

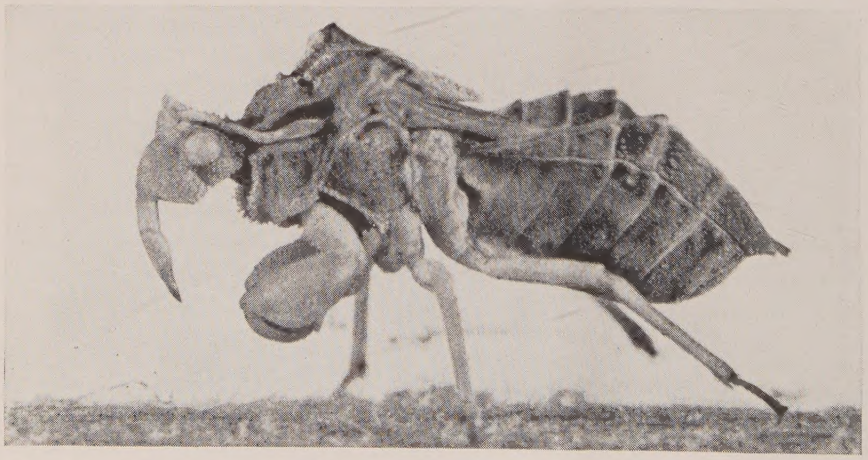


MOTHER HOLDS HER BABY CLOSE

As a baby the spider monkey looks much like a black-face comedian

A PROPHECY and A Parable





NATURE'S FLYING TANK
The ambush bug shown in the process of getting a meal. Below, the chitinous remains of a deceased warrior

MANY years ago I read a story about a boy who had the rare privilege of studying under the great Louis Agassiz. I do not remember where I read it—perhaps it was in a grammar school reader—but I never forgot the lesson it contained. The great naturalist, the story said, took a preserved fish out of a jar of alcohol and laid it before the boy.

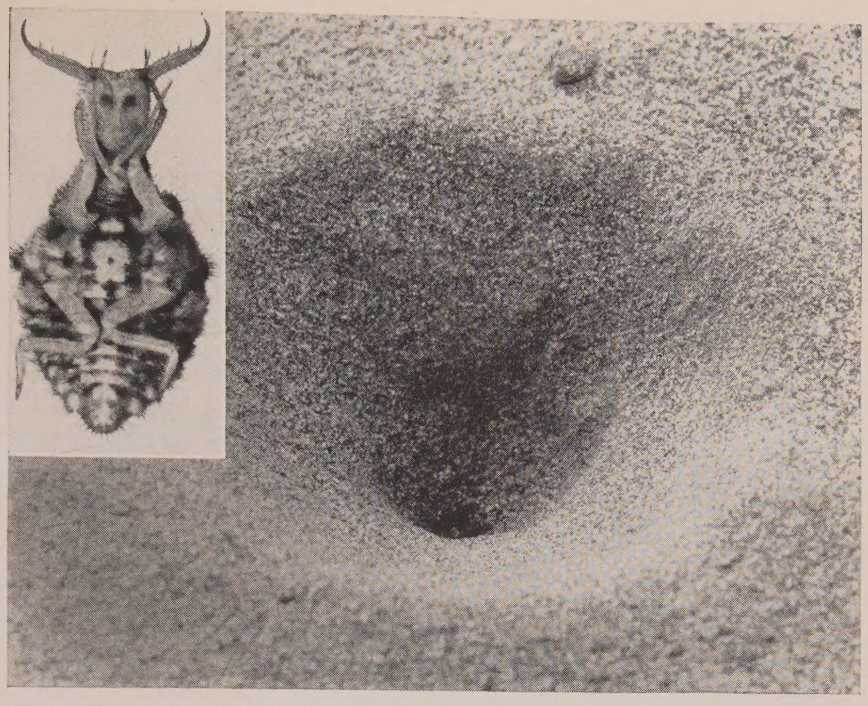
"Look, *look,* LOOK!" he said, "and tell me what you see."

Hours afterwards the boy reported a few interesting details he had noted. "Good, but keep on looking!" he was told. And so it went, day after day, until the boy hated the sight of that fish, but he had learned his lesson.

He was learning how to LOOK—patiently, thoughtfully, understandingly—even at a common, ordinary fish. The boy may not

By
GEORGE
ELWOOD
JENKS

Photographs copyright by the author.



EVERYTHING COMES TO HIM WHO WAITS
At least that seems to be the philosophy of the ant lion, sometimes called the doodle-bug, which digs a hole in the sand and waits for lunch to come tumbling down the sharp incline

have realized it then, but the great naturalist had started him upon the trail that leads to the high land of the Seeing Eye and the Understanding Heart, the magic realm inhabited by Aesop, Maeterlinck, Henri Fabre, and others whose names will be remembered and loved when a thousand recorders of cold, scientific facts are gone and forgotten.

As its keen insight develops with use, the seeing eye opens up a new and fascinating world where fancy glorifies cold facts, and science becomes a gateway to alluring vistas of imagination and romance. We all know that the stories of the natural sciences must be based upon truth and accuracy, but that is no reason why they must be dry and cold and dead. The fossilized bones of paleontology live again only as they spur the imagination to re-create that ancient world of elemental strife and mysterious, terrifying life.

In the insect world, the seeing eye finds a host of strange human resemblances and startling parallels. In the forms and life habits of these little creatures we can find grotesque caricatures, cartoons, human interest stories, fables, parables and prophecies. And it is almost uncanny the way some of them seem to apply to man's life today! First let us consider The Flying Tank.

What a pity it is, in this modern machine age, that so many of our keenest scientists are striving frantically to outdo each other in the creation of ruthless engines of destruction! War mania seems rampant. Army planes can shower a group of machine gunners upon a peaceful countryside; huge armored tanks can crash through villages at sixty miles an hour. Perhaps the next development will be a flying tank—with a still wider field of destruction.

But, even so, Nature has beaten us to that particular weapon by a million years, or more. Evolutionists tell us that insects were among the earliest forms of life; that they have developed but little since man appeared.

The ambush bug is only about half an inch in length, but it is a deadly efficient, killing machine. *Phymata erosa* is, perhaps, our commonest species. It is an armored flying tank—its no man's land the hearts of flowers where it lies in wait and kills the busy workers, such as our honey bees. This insect operates on six armored legs instead of wheels. Its jointed, interlocking steel-like plates make it an impregnable fortress, impervious to the stings of much larger wasps and bees. Even its antennae are armored, and fold back into protecting grooves. Its double-acting forward "gun" is retractable and is carried in a housing beneath its "hood".

On spotting its prey, a dead fly in our illustrations, the insect tank advances cautiously to attack. Its powerful armored claws are poised, ready to clutch its victim—it leaps—and we see the stinger go into action, first as a "gun" and then as a suction pump as the tank refuels itself on the field of battle. Long after the "crew" has deserted the tank and its victims are gone and forgotten, the flying fortress still stands unbroken—a rusty old tank in a junk yard—but a lasting monument to Nature's superior efficiency.

This insect tank can fly faster than man can travel on the ground; it is an engine of destruction with an unlimited cruising radius, as it never has to return to its base to fill its gas tanks, but refuels at will on the juices of its victims! Let us now turn to The Fable of the Greedy Doodle-Bug.

Once upon a time, perhaps long before the dinosaurs were hatched, there was a doodle-bug. Its proper name was ant lion, and it lurked in hiding at the bottom of its pitfall ant-trap in the dry and shifting sand. The doodle-bug was Nature's perfect example of everlasting selfishness and greed, never doing a lick of work except what was necessary to keep its cruel trap in repair. It just hid in the sand and devoured everything that fell down the steep incline of the trap into its jaws, smacking its lips just as loudly when it devoured its brothers and sisters as it did when a stranger ant or bug was caught.

When hard times came, the doodle-bug was so lazy

that it would just curl up in the sand and drift into a deep sleep. Then it would awaken and begin to eat all over again. The time even came when the intestinal outlet of his stomach closed up and elimination ceased, but he continued his alternate gorging and sleeping until one day he entered the pupal stage for his final snooze.

At last the cocoon opened, and a delicate lace-winged fly emerged. The doodle-bug may have exulted as he shimmered through the summer sunshine: "I'm a doodle-bug angel now, and I'm going to live forever!"

Nature, however, only smiled pityingly. During the pupal sleep the intestinal outlet had cleared and it was forced to eject all of its larval holdings. Now the doodle-bug learned how it felt to go hungry. It was so frail that it could catch and kill only the weakest of insects. No more could it lie in wait for victims to come tumbling down into its jaws, gorge itself, and sleep at its own sweet will.

Even this unhappy life was all too short. For a few brief days the doodle-bug fluttered around, then it laid its eggs in the loose sand and died. The eggs hatched and the children entered upon another long stretch of selfish greed. But, like their mother, they were never satisfied. They were chronic kickers, generation after generation. They kicked so often and so hard that they got in the habit of kicking themselves backward, and had to travel that way, unable to take a single step forward. Scientists tell us that they have become retrogradient. Instead of evolving into higher forms the greedy doodle-bugs have been kicking themselves backward down the ladder of evolution for unknown ages!

Moral: You can't put anything over on Nature—you'll GET YOURS all right!

•

THE CROCUS

By ALICE JOUVEAU DU BREUIL

The crocus is the gnome of flower-land:—
He lives so near the earth and seems to lift
His head reluctantly above. The rift
Once made, he scatters with a lavish hand
The gold and purple of his hardy band;
And through the mesh of grass attempts to sift
The treasures of his underworld, in swift
Desire to meet the upper world's demand.
To live quite near the earth is no disgrace:
Of loam may dreams be woven just as well
As of the stars above; as lovely, too;
For loamy fantasies take flowery face
And breathe their witchery in perfume's spell
That all the stars of Heaven can not woo.

•

The Neglected Climbing Hydrangea *By* VICTOR H. RIES

NURSERIES for many years have cataloged, among their vines, *Hydrangea petiolaris,* the climbing hydrangea, sometimes called *Hydrangea scandens,* and yet they sell few of them. Why? Partly because gardeners are not acquainted with this delightful vine, and partly because many who do have it have not been successful in growing it.

At the Arnold Arboretum near Boston a huge and beautiful specimen of this vine grows on the Administration Building. Sometimes it is seen on some large private estate. But seldom do we see it in any small garden. The accompanying photograph was taken in Akron, Ohio, where the plant was growing on the inside wall of a paved open porch, where it had enough light, but some shade.

The somewhat glossy dark green foliage and the airy white flowers are profuse during June. In winter the light brown, coarse twigs are also attractive. The main branches cling close to the wall or building, while the smaller branches project more or less horizontally.

The climbing hydrangea is apparently as hardy as the well-known fall blooming or Pee Gee hydrangea, but it is often difficult to establish. Purchased as a pot plant, it is best planted in spring in good soil and in either a sunny or only partially shaded situation. Given good care throughout the first season and protected with a mulch the first winter, it should start to give results about the third year of its setting in a permanent location.

"THERE WAS GRANDEUR IN THE WAY HE RODE THE STORM. HE WAS HEADING FOR HOME; THE HURRICANE HAD INTERCEPTED HIM; YET HE WOULD NOT TURN BACK"

WILD BROTHER'S TEMPERANCE

By ARCHIBALD RUTLEDGE

Illustrations by R. Bruce Horsfall

WE OFTEN hear that an individual or an athletic team has "gone into training." The expression has a twofold meaning: that the person or persons are now living temperately; that certain unhealthful practices have been temporarily abandoned. I do not know but that one of the most distinguishing differences between human life and the life in the wild is the fact that wild creatures appear to be always in training. They keep regular hours. They insist on certain periods, day and night, for rest and relaxation. They play. Under normal conditions, no one of them is a glutton. If one happens to get the least bit off condition, he at once refuses to eat. The result is that wild birds and animals are remarkably sane, poised, and natural. They take care of themselves. At any moment they are ready for an emergency. Every day they live they are like Olympic athletes on the eve of the Games. And if there is one great lesson that all of us can learn from Nature, it is that to be temperate in all things is as likely a road to happiness and to good health as any we can find.

One day during a drought I was walking across the bed of a dry pond. As my footing was on sphagnum moss, my advance was noiseless. Just on the farther rim of the pond a little doe sprang from her bed in some huckleberry bushes. By scent she knew I was near, but did not know where I was. Her jump from her lying-down position took her a third of the way across the pond. So lithe, graceful, and effortless was her spring that I measured the length of it: 16 feet, nine inches. I have measured the jump of a buck: 32 feet, 11 inches. But he was not extending himself. I have seen a deer jump an obstruction nine feet high, and I know he could have gone higher. Indeed, so physically fit for a crisis is a deer that I am almost inclined to believe what an old woodsman once said to me: "A deer can jump just as high and just as far as he has to." And why is he so superb a performer? It is because he is temperate. He keeps in training. Nearly all our physical woes are directly traceable to our behavior or to the behavior of our forebears. Wild creatures have no doctors, hospitals or nurses. They do not need them. And if one of them is sick or injured, he knows very well how to take care of himself.

Nature's children have their recreations: I have watch-

ed the wild deer, the otter, foxes, and many birds at their playtime, at their innocent little festivals. But I never saw one play to exhaustion, as many of us do; nor do bitter rivalries and hatreds develop in their play. In their sports, they often feign quarrels. But these little spats mean nothing. They harbor no grudges.

They are most obedient to the mighty laws under whose mandates they were born. I know that a wild thing will die rather than disobey a law of nature. One day after a big storm I investigated a hollow limb that had been blown from an oak tree. In the hollow I found four baby raccoons, funny elfin philosophers; and I determined to make pets of them. For eight or nine days I kept them in a wired enclosure, offering them all kinds of food. Not an infant would taste a morsel. They would sit there and look at me wistfully as if to convey to me the idea that I had forgotten the Main Thing. And then I remembered: I had forgotten the water! "What a fool you are," I said to myself. "Don't you know that a raccoon will never eat anything until he washes it scrupulously?" Those babies were going to starve to death rather than disobey one of the laws by which they knew they ought to live.

"AS SOON AS A PAN OF WATER WAS SUPPLIED, EVERY BABY TOOK A MORSEL OF FOOD . . . AND WASHED IT CAREFULLY BEFORE EATING IT"

As soon as a pan of water was supplied, every baby took a morsel of food, ambled over, and washed it carefully before eating it. But one day I gave them some cookies; and when they dipped these in the water, they melted before their eyes! Then my baby raccoons sat around the pen, holding a solemn conference, and decided that there were some things that did not have to be washed.

It seems to me that a certain regularity of life indicates temperance, inasmuch as it shows a fine appreciation of the value of time, and how it should be spent. We squander much time speeding from place to place, from excitement to excitement, and rarely are better for either. The wild turkey affords us an admirable illustration of the routine of wild brother's day. Waking on the roost at daydawn, the wild turkey will fly to the ground about sunrise; but if the weather is cold and wet, he may stay on his perch until much later. I have seen a flock still roosting at nine o'clock on a rainy morning. Once on the ground, the great birds immediately begin to forage for food, which they take sparingly and fastidiously. They wander around, feeding until about eleven o'clock, when they take a long siesta, during the course of which they seek out some sunny sandy bank, where they take dust baths. During the middle of the day, although they have not been doing what we would call work, they rest from two to three hours. Then they begin to feed back toward their roosting trees. They usually fly up at sunset, though sometimes they may do so a little earlier or later. If they are not disturbed, and if food is adequate, they may, so exact is their routine, cross the same road at the same place and at the same time day after day. I have tested this and have found it true. Once a friend took me in a turkey-blind so that I could watch the birds feeding within a few feet of me. We settled ourselves in the blind at 2 o'clock in the afternoon. I asked him if I might smoke.

"Well," he said, "they will be here at 2:10. You'd better wait until they are gone."

I thought he was fooling me; but at nine minutes after two, seven gobblers and four hens trooped up to the blind. It is regularity of regime of this kind that makes me believe that wild brother lives a very decent and respectable life. He never keeps late hours. He is always sober, industrious (in his own way), and temperate. The cares of which we complain so much are, in most cases, due to our disregard of the simplest laws of hygiene and common sense. A temperate person has about fifty chances to one over an intemperate person in the matter of attaining what we call human happiness; and by a temperate person I mean one who is not a spendthrift of his physical birthright. A man can be as intemperate in play as in work; in eating as well as in drinking; in short, in living at too high a pitch. On one occasion Boswell asked his famous friend, Sam Johnson, why he no longer drank any kind of liquor. "Sir," replied Johnson, "I find that more pleasure is to be had from staying sober than in getting drunk."

Strange as it may seem, I have on several occasions seen Nature's children intoxicated. But the matter was purely accidental. I have seen tame ducks under the influence of liquor from eating wine-mash; and I have seen both cedar-waxwings and robins decidedly groggy from eating the berries of the wild orange and the pride-of-India or umbrella tree. My observation, however, led me to believe that the birds so affected were all young. The older birds seem to avoid these berries or to eat them sparingly.

I have mentioned the jumping of wild whitetail deer as illustrative of their perfect physical stamina. They show it in other ways. I have an authentic record of a ten-point stag that was wounded by hunters at eight o'clock in the morning. At the time there was a pack of fourteen good hounds after him. A long and unequal chase through the wildwoods began. One after one the hounds fell out of the chase. The whole affair ended at five o'clock in the afternoon, when the wounded buck, with only one hound

after him, swam the Santee River and escaped into the immense and lonely wilds of the Delta. As hot as the chase had been, the deer must have averaged at least ten miles an hour. Of course, when he could, he must have paused to dodge and skulk. But even so, he must have run a distance of ninety miles, even when wounded—almost four Marathons! And what accounted for his escape? Only years of temperate living, bringing to him that strength and vitality that alone could avail him in this life-and-death pursuit.

One of the certain fruits of temperance is courage; I do not mean the foolish recklessness that is more often associated with intemperance. I mean the calm acceptance of danger, and the resolution to meet it. I recall seeing one day something that impressed me with the bald eagle's dauntless spirit.

At the time I was in the marshes of the Santee Delta, about three miles from the ocean. A storm was rolling up from the southwest. It was not an ordinary storm, but the lunatic fringe of a West Indian hurricane. Darkness was before it and under it. The inky sky took on a sinister greenish tinge, then an angry saffron. A greenish-yellow sky usually portends disaster. Things looked so bad that I decided to spend the night where I was rather than risk the rising wrath of the big river. Yet I wanted much to be at home. I looked at my small boat; then at the stormy and menacing sky; then at the distant mainland. I was afraid to take the risk, with the twilight falling, and with a wild tempest soon to obliterate the world.

But as I looked for the last time at the crazy sky, I saw a great bald eagle, that doubtless had been cruising far up the river all day, beating his way back powerfully to his roosting tree on Cedar Island, on the very tip of the Delta. There was grandeur in the way he rode the storm. He was heading for home; the hurricane had intercepted him; yet he would not turn back.

It is a common sight to see birds fleeing before a storm; indeed, to see vultures heading in a certain direction is often indicative that a storm is coming; but here was a bird driving heroically into the very heart of the gale. He wanted to get home—just as I did. "But," you object, "he had the advantage: he had wings." Yes; and he had something more, to plunge dauntlessly toward that green-bosomed storm: he had a great heart; a certain elemental valor, which we should do well oftener to associate with these children of the wilds. They are no cowards; we have no right to adjudge them so by considering merely their fugitive attitude toward us, armed as we often are with weapons for their destruction. If stags carried high-powered rifles and if hunters were weaponless, the popularity of deer-hunting as a sport might somewhat wane.

Among the grand memories that I cherish of my life in the wilds is the eternal picture of that eagle defying the gale: far, far through the darkness and the danger, with massive power and grace I watched him heading homeward, a lone champion, who not only had the physical strength to combat Nature herself but the greatness of heart to meet the lowering peril. He made me think of Julius Caesar's magnificent words when some of his friends warned him that there was danger in going to the Capitol:

> Danger knows full well
> That Caesar is more dangerous than he:
> We are two lions littered in one day,
> And I the elder and more terrible,
> And Caesar shall go forth.

Courage, as I have said, appears related to temperance; so are alertness, readiness, precision of judgment, and many another similar virtue. The qualities that make for security and for happiness are the qualities born of temperance; and this is true in human life as well as in wild Nature. In most cases we have ourselves to blame for our headaches and our hangovers. Wild brother takes care of himself; he keeps in training for whatever life may call upon him to do. Nor does he make his enjoyment of existence dependent on the artificial stimulation of unnatural excitement.

•

Rockledge Ravine

By U. C. DEIKE

There's a tumbling, turbulent, splashing stream
  That gallops along its way,
Through a wild ravine, in the forest green,
  Where dryads and fairies play.

Bold violets cling to its rugged banks
  So close to the dashing sprays
That over their heads a light rainbow spreads
  And jack-in-the-pulpit prays!

Shy maidenhair ferns wave gracefully there,
  Where the dark soil is enriched;
And a heron stands in the silver sands,
  As if he had been bewitched!

Sandpipers teeter on slippery stones
  And frequently wet their feet
While breaking the drone of the undertone
  With whistles cheerily sweet!

And many a wary old trout is there—
  And that's where I long to be!
Merging softly in with the background dim,
  To pause, and listen, and see!

The Red Gods awaken the savage lust
  To cast, and capture, and kill!
But the White Gods call where the sunbeams fall
  And reverence lingers still.

So I'll broil a trout, as a sacrifice,
  On The Rock that splits the stream:
Then rest by the fire, where quaint legends are,
  While I meditate, and dream.

With Nature on an Enchanted Isle

By DOROTHY W. LATHROP

The Audubon Nature Camp is on Hog Island, Muscongus Bay, Maine, where a diversified wilderness attracts a wide variety of wildlife

Campers seek marine life along the shore, and, below, turn their field glasses on some of the multitude of sea birds in the region

Two of the younger campers who have already gotten acquainted with binoculars

THERE is today an island as mysterious and beautiful as Jules Vernes' of long ago—an island primitive, real, accessible. Sun-seasoned, winter-chilled, silent but for the call of bird and lap of water against its rock-walled sides, this island, secure and stately, plays a strategic role. It may be likened to an old jewel, uncut and unpolished, in a modern world setting. Mildly curious, each forest creature displays little or no fear of man. As the sun throws its shafts of light through pathless virgin growth hung with gray-green lichen, illuminating small areas of deep moss and perfect fern, one has the sense that he has touched the very beginning of things. He gently merges, naturally and unconsciously, into accord with his surroundings, for he has fallen beneath the irresistible charm of an island—the Todd Wild Life Sanctuary, in Muscongus Bay, Maine.

In 1908, a white yacht quietly nosed its way through the blue waters of Muscongus Bay and skirted the mile and a half length of an island heavily timbered with spruce. Intently observant from the deck was one of the most gifted women of her time, Mabel Loomis Todd, wife of David Todd, Professor of Astronomy at Amherst College. Hearing that the island was about to be stripped for pulpwood, she managed to acquire three-quarters of it, and a friend purchased the remaining fourth. Here the Todd family spent their summers until the death of Mrs. Todd in 1932.

Because of the great love her mother had borne for this island, and her own interest in the preservation of its birds, trees and flowers, Millicent Todd Bingham, her daughter, naturalist and writer, determined that the land should become a sanctuary in her mother's name and memory. Mrs. Bingham interested the National Association of Audubon Societies in establishing the Todd Wild Life Sanctuary and, in connection therewith, the Audubon Nature Camp for adult leaders. Control of the entire island was acquired, and the peninsula on which the camp buildings are situated was purchased and donated to the Audubon Association. The balance of the island is now leased to the Association on a dollar-a-year basis. Thus was founded the Todd Wild Life Sanctuary, with its adjunct, the Audubon Nature Camp; a dream became a reality, and through the initiative of John Hopkinson Baker, executive director of the National Association of Audubon Societies, the unlimited possibilities that a wilderness island offers as a classroom were realized through the establishment of the camp.

Seabird life is abundant on nearby islands, where great blue herons, ospreys, cormorants, gulls, guillemots, terns and petrels are found and may be observed at close range

The conservation and preservation of our natural resources and wildlife has become a national movement. The growth has been gradual but insistent. Down through the centuries, man has appropriated wealth without measure from natural sources near at hand. When these reservoirs of supply have failed, he has moved on to fresher fields. Only within the present century has extensive thought been turned to the necessity of guarding our economic reserves and protecting endangered species of wildlife for future generations.

Originating with a few pioneers, realization of the importance of conservation has now reached clubs, schools, colleges and related organizations, and it has become a force as a state and national issue. In particular is the Nature teacher of the present time concerned. Slowly, but unmistakably, he is being required to apply himself to the study of Nature as a whole. He is gradually turning away from the analytical and dissecting point of view to the more appreciative attitude of the ecologist.

It is highly probable that many a zoological teacher has never seen, save under museum glass, and much less held in his hand, the live subjects of his lectures and discussions. He has been limited in his field work, especially in the past, by distance, and transportation costs. And so he labors, through his text-book, to take his classes into another world where he himself has never been, and he cannot impart the stimulus and enthusiasm that are created by direct contact and observation.

The Audubon Nature Camp, founded on a non-profit basis, strives to overcome this lack. In the two years of its existence, it has been remarkably successful. Four hundred and thirty-one enrollees from twenty-nine states, three Canadian provinces and one foreign country—

A magnolia warbler parent satisfies the mealtime demands of one of its hungry offspring

Switzerland—have found their way to this notable Nature camp off the coast of Maine. Many who attended the first year returned the next. From the ages of seventeen to seventy, teachers in elementary, high and normal schools, professors and students from colleges and universities, members of Government Departments, leaders in the Girl Scout, Boy Scout and Camp Fire movements, representatives of garden clubs, counsellors in summer camps, lawyers, editors, museum assistants, clerks, housewives—people from almost every walk in life—have gathered together on the little island now fast becoming famous.

Two forty-foot motor boats are used to carry campers to outer islands for study and for picnic lunches on the rocks

Three substantial buildings house the campers. Well-prepared food planned by a dietician, ordinary comforts, and an infirmary with a qualified nurse are all available. A carefully chosen staff of young yet well-known scientists lead their classes in active field work.

It is difficult to portray in words the fervor and tireless energy of the average camper. He arrives at the island with the natural ambition of obtaining all the knowledge possible. He departs with new convictions and a broader view of Nature as a whole, and underlying his gain is the desire to impart—to give his best in the cause of conservation of wildlife.

In 1937 one hundred and sixty-four birds were identified during the summer months. Of the warblers residing on the island, one of the outstanding is the Parula warbler, which builds its little cradle-like nest in the swinging *Usnea,* a gray-green lichen festooning many of the spruce trees. The sea birds offer an unusual range of study, since adjacent islands harbor great blue herons, ospreys, cormorants, gulls, guillemots, terns and petrels.

Two forty-foot power boats, piloted by Maine sea captains, take groups to these outer isles where picnic luncheons are often served on the rocks. Birds are photographed and sometimes banded, nests and eggs are examined, and a tired but happy group returns to the camp at sundown, eager to discuss with other campers the achievements of the day.

The activity and ardor of the insect classes are unmistakable. One watches with vivid interest the lively and busy occupants of a glass ant house, the spoils of a beetle trap, or the results of field and fresh water trips. The main objective of this course is to learn the characteristics and environments of insects and their interdependence with other forms of life.

During the last session of 1937 the plant-life class made a valuable addition to its already long list of mosses by the discovery on the mainland of a tiny, rare luminous moss, *Achistotega osmundacea.* This moss is found in caves and other dark places in the woods and gives off a golden-green glow when reflecting light from a flashlight, or, even, the moon. More than five hundred plants have been recorded on the island and its vicinity, the sea coast introducing new forms to those who have studied only the inland plants.

On many of the boat trips, it is not unusual to pass schools of porpoises, or colonies of seals that are sunning themselves on the harbor rocks. There are the joys of lobster picnics and bathing in both deep and shallow water. The rock shore, mud flat, tide pool and sandy beach offer a wide range of the invertebrate kingdom. One also has the opportunity to observe the inmates of a salt water aquarium, and such daily activities as the comical tussle and perpetual warfare of the hermit crabs; a red jelly fish, with no conscience, devouring a white jelly fish; a shy baby lobster seeking to hide from public gaze behind a sea anemone or some insufficient seaweed!

Indeed, every day, every hour, unfolds new mysteries and age-old truths. The sky, the sea and the forest are the open classrooms. In the evening all assemble in the old ship-chandlery over the water, now a camp museum. The walls of this quaint building are hung with fish nets, bird nests and colorful charts of animal and vegetable life. On shelves are strange forms from the sea in bottles. Geological trophies glisten in rows on a table, and a tray of living mosses rests beneath a group of pressed and mounted ferns. In a corner, opposite the grand piano, are shelves of books—an ample supply of recommended reading.

Here one listens in the evening to illustrated talks given by the staff, or by guest speakers. A general discussion follows. Through these evening forums the campers obtain wider and clearer pictures of all creation. Their major interests are woven and interwoven with other major interests, a huge tapestry of Nature's complex relationships, which, unfortunately, man has so often upset. But on this little island a higher law, older than the island itself, still permits, in a great measure, the continuance of her balanced schemes. Each session closes with a day set apart for conferences between staff and students. Then teaching programs may be discussed and adjusted to meet individual needs.

Two short weeks of salt sea air, sun, new friendships, song and laughter, pass all too quickly. And through this medley of happy living is the deeper note, insistently and steadily ascending in volume—the desire to attain more and more knowledge of this world in which we live and the power to impart that knowledge clearly and courageously in Nature's defence.

When Nature Sings a Love Song

The beaver's mud-pie technique is a bit different from that used by the yowling bob-cat, but it all adds up to the same

By ELLSWORTH JAEGER

Illustrations by the Author

THAT all the world loves a lover is as true in the Nature world as elsewhere, for love is ever skipping a heart beat, even in the wildwood. Romeo is a popular role on Nature's stage, be he beetle, bug, bird or lordly monarch of the forest. Like their human counterparts, the wild folk, too, play other parts in the love drama and Don Juan frequently holds the spotlight.

The first animals were "hermaphrodites", that is, dual sexed. But when the individual sexes appeared, an evolution of sexual relations developed. At first promiscuity was, perhaps, the order of the day, but as the centuries passed in their succession, polyandry and polygamy became common, followed later by monogamy. Just as in human society, all of these forms are also found in animal life today.

There are many forms of Cupid's advertising in the forest. The love song is popular, as well as matrimonial advertising with love scent and pantomime. One "Romeo" who resorts to love scent is the mountain goat. Goats have long been noted in song and story for their aroma, and although the mountain goat is not really a goat, but a member of the antelope clan, he nevertheless has a perfume or scent that is particularly strong when Cupid sends those shafts into his willing heart. Both Billy and Nanny have this love scent, but Billy seems to have more. This love perfume is developed in a black mass behind each horn. In the fall the mountain goat becomes love-conscious and it is at that time that these glands become active, giving off their oily secretion. When Billy is in love, he is very boastful and thrashes the brush right and left with his horns. In this way he scatters his love messages over the mountain side. The oily scent readily adheres to everything and whispers sweet nothings to Nanny as she passes by.

The beaver folk, too, believe in love perfume. When a beaver is in love, he makes mud pie valentines, which clearly advertise to all unattached lady beavers in the community that a handsome, wealthy, eligible bachelor is looking for a bride. These valentines are little mud patties, upon which is placed a drop of that precious beaver perfume, castoreum. The mud pies are placed at strategic points along the banks of streams and ponds, and advertise to all and sundry that the beaver's objective is matrimony.

Love songs also play an important part in the love making of the wild folk. We are all familiar with the spring love calls of our birds, but others of the wilderness, too, sing of their heart's desires. The lynx, for instance, sings like a love-smitten tomcat, mewing and perowing when serenading his dream lady. Both of these cats seem to have attended the same school of voice culture, for their songs are much alike, except that the lynx uses a loud speaker when performing.

In autumn the bull elk bugles his combination of love call and challenge, like a medieval lovesick swain before the castle wall of his chosen lady. His bugling pours out with a throaty roar, rising higher and higher in bugle-like tones until finally it becomes a shrill whistle. After that it fades into lower throaty sounds ending with a series of savage grunts. The bull elk is a trifler, however, for he sings to many feminine ears. He has the reputation of being the greatest polygamist in the deer family and that is almost the height of polygamy.

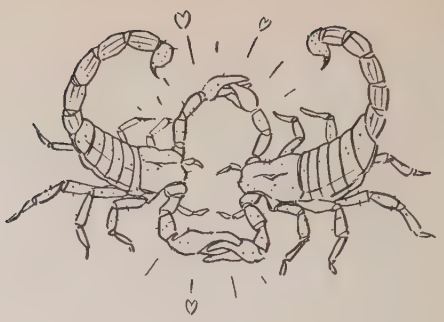
In the moose family it is the lady who croons the love

songs. It is she who courts the lordly bull and coyly reveals the trysting place with her song of songs. This love song often betrays the lover to his doom, however, for hunters mimic the cow and thus lure the bull within range of their rifles. One of the cow's love songs seems to ask, "Where are you?", an "ee-e-e—oooo-oooo-yuh", the beginning of the song sounding like a high violin note. The bull moose may answer with a grunt, an "uh-yuh", or he may slash the brush with his shovel-like antlers, making a hollow, ringing sound, as if a canoe had been dropped upon the rocks.

During most of the year the porcupine prefers his own company, for he is the most solitary of the wild folk. When Cupid's invisible arrows begin to find their mark, however, he begins to look for company. As he wanders along the trails, he sings his love song, a long continued "wa-wa-wa-waa-a-a-a", like the voice of an infant, rising and falling with heart-felt quaverings. His voice evidently has that "it" quality, for he always manages to interest some prickly fair one.

The dance, too, enters into the love making of the wood folk. Many resort to the measured light fantastic to attract or awaken the slumbering love god. The prairie chickens are noted love dancers, and the shy woodcock is, perhaps, the most spectacular. When the love dance urge is upon him, the sky is the limit, for that is exactly where his fervor leads him. After a series of buzzing notes he shows a passionate devotion by taking to his wings with a rush, sweeping upward on a spiral two or three hundred feet from the earth. As he speeds upward, the stiff primary wing feathers make a high, whistling accompaniment to this love drama. Faster and higher he climbs, and the more rapidly his wings beat, the shriller becomes his wing music. Reaching the peak of his effort, he circles rapidly a few times, and then down he zig-zags, uttering a clear, twittering whistle. This entire performance he repeats again and again.

Love comes even to the lowly scorpion. On love's quest he is often smitten so badly that he forgets to eat and



wanders far and wide over the desert, searching for his heart's desire. When at last he finds her, he rushes to her with outstretched claws and clasps hers in his. Thus hand in hand they stroll down lover's lane together. The scorpion lover walks backward, leading or pulling. The lady obediently follows. Now and again they halt and seem to look deeply into each other's eyes, and then they resume their strolling again, actors in the old, old drama.

At times a jealous lady scorpion will try to break up love's dream. Again the triangle becomes the scorpion suitor's problem. His lady may be so bewitching that she will have two suitors paying court at the same time. When this situation arises, each suitor takes her claw nearest him and tugs until it seems as if the lady will be pulled asunder. It never seems to occur to these lunatic lovers to battle in any other way. So violently do they jerk each other around that it seems as if the lady's arms will be torn from their sockets. But she never seems to be the worse for wear after these tugs of love. Suddenly the faint-hearted swain gives up the struggle and the pair again renew their strolling. The scorpion boy friend at last convinces the lady that he will make an excellent husband, and he then leads her to their honeymoon bower, a burrow under a stone, and shuts the door by kicking the sand into place. But alas, their marital happiness is short-lived. After their honeymoon the scorpion lady may get rid of her husband by eating him for breakfast.

Love even finds his way in the cold, steely blue Antarctic, for here we find the penguin boy friend paying silent adoration to his darling. The courting scene of the penguin love birds is touching indeed. The hen penguin will take up her position of watchful waiting in a nest-like hollow that she has scooped in the snow and earth. This evidently indicates that she is ready to settle down to a life of domesticity. When "Romeo" penguin finds the lady of his choice, he pours all his tender yearning into a wordless tale. This is done, as far as we know, in pantomime. He picks up an imaginary stone and places it before her with great rapture. This is evidently the "diamond" (in the rough) of the penguin betrothal. Since stones are used by (Continued on page 245)

The trap-door spider's siesta is interrupted by the sound of scratching at her entrance above. Knowing exactly who the intruder is, she shrinks back in an attitude of defense. On the ground above the hunting wasp known as *Pedinaspis planatus* has found the door, caught the edge with her powerful jaws, flipped it open, and is slipping in before it can close behind her.

•

THE WOLF AT THE TRAP-DOOR

As Recorded by George Elwood Jenks

For those with the seeing eye and inquiring mind a multitude of fascinating insects of many species live their lives in nearby sunlit fields and woods. But there is also an underworld beneath our feet where the inhabitants fight for their existence as ruthlessly as in any human gangland. There, too, we find that the honest workers are preyed upon by parasites and predators—the killers and racketeers of an insect gangland.

In the front rank of the honest citizens of that world we find the harmless and industrious trap-door spider, *Bothriocyrtum californicum*. We have learned to admire her for her skillful craftsmanship in building her silk-lined underground nest with its wonderful hinged trap-door.

Surely, we think, with this strong, well-camouflaged door and her snug nest in the hard adobe clay, she ought to be safe from all predatory bandits. But we soon learn that this is not so. In fact, we would find that from

The invader joins her prey in uneven battle. The wasp stings her victim several times until she is certain the spider is paralyzed. The wasp pauses often to clean up and primp. In fact, she is most fastidious, licking her "paws" like a house cat and carefully cleaning her face and antennae.

Much magnified to show clearly, the egg of the wasp is seen laid on the abdomen of the spider. In about four days this egg begins to hatch. During its lifetime the wasp may overcome and lay her eggs on as many as thirty-five trapdoor spiders. Still, Mr. Jenks voices the opinion that the wasp seldom dies of old age but that, sooner or later, she is injured or killed in battle. The spider is so much stronger than her enemy that the slightest slip in the latter's technique of battle may spell disaster.

one-third to one-half of the nests we dug up contained only the half-devoured remains of the plump little spiders that built these snug retreats.

Furthermore, as we study the behavior of the spiders, we find that their whole existence seems to be dominated by fear. When we open one of their trap-doors it is only occasionally that we find one with the courage to dispute the invasion. If the nest tube is broken in digging it up, the spider will usually start immediately to seal up the open end with a temporary stopper. She seems to feel safe only when she can "crawl into the hole and pull the hole in after her"! It seems quite obvious that she *knows* she is in constant danger.

The life-history of the trap-door spider is intensely interesting, but that story has been well told and beautifully pictured in these pages by Passmore and Beck (Nature Magazine, October, 1934).

So let us go on and take up the trail of her enemies and see what we can learn about the "something" that has frightened her for ages until her life and habits have been influenced by a constant effort to escape from the overhanging menace.

During three years of extensive investigation I have collected conclusive evidence pinning the guilt, in at least two thirds of the cases, upon a wasp, *Pedinaspis planatus*. It has also been called *Psammochares, Planiceps, Pompilus,* and *Parapompilus planatus.*

●

Here we see, enlarged about three times, the larva of the wasp as it is increasing in size and, then, the larva starting to spin the cocoon. In many cases the cocoons are suspended high in the nest-tube. In this case the larva starts at the bottom. It seems remarkable that this undeveloped maggot, with only its mouth as a "spinneret", can produce silken threads that rival the work of many of the spiders.

These three pictures show the development of the cocoon. First, left above, the starting of the cellophane-like diaphragm that will form the waterproof "roof" of the house. As it works, the larva cuts away the temporary false diaphragm, apparently erected as a temporary support, and turns in the edges to form the cap or cupola. This is shown at the right, above, with the wall of the "attic room" cut away to show the construction. This flimsy, ornamental cupola is loosely attached to the strong, waterproof diaphragm that roofs the cocoon and completely seals the spider's tube. At the right is a finished cocoon with the spider's nest tube cut away. Sometimes larvae make plain cocoons without cap, diaphragm or "attic", and either males or females may be found in each type of cocoon.

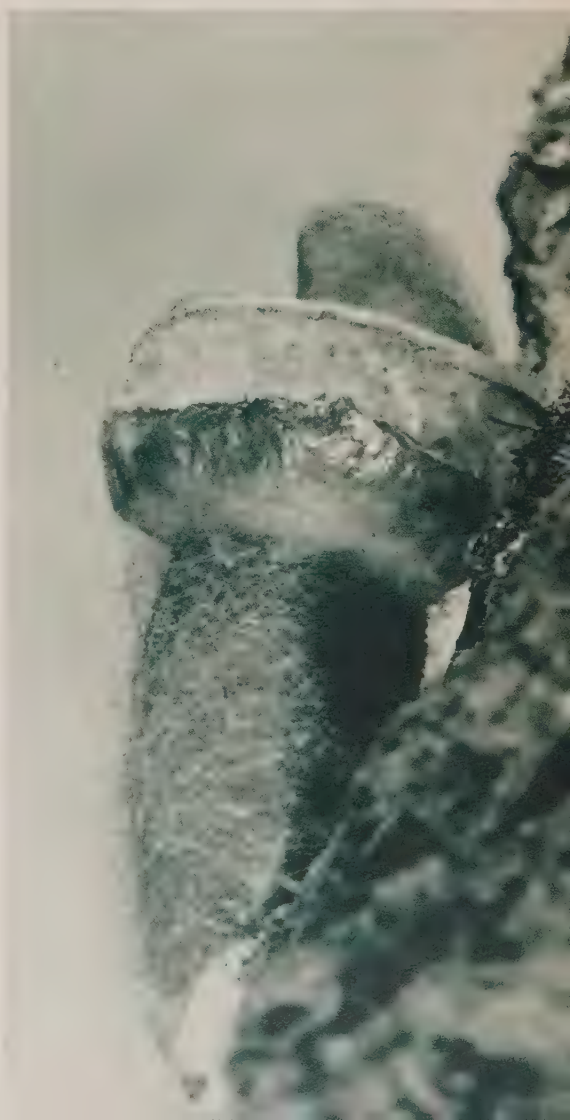
●

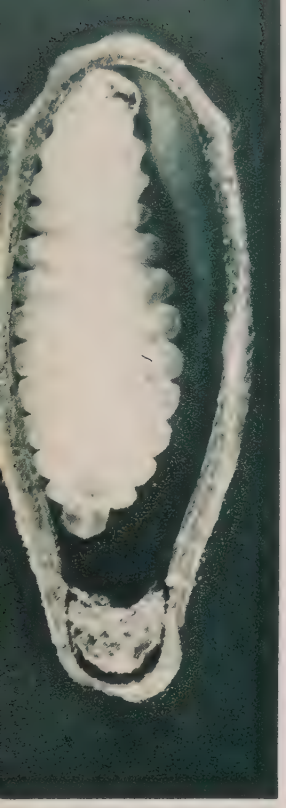
The other third of the "killings" must be blamed upon "mysterious enemy" gangsters. These are rare Cyrtid parasites belonging to a new species unknown to Science, except that the finding of a single specimen has been described in an unpublished manuscript by Dr. F. R. Cole of Redlands, California. But that is another story. It will probably require another year to complete the photographic evidence against this weird insect machine-gunner.

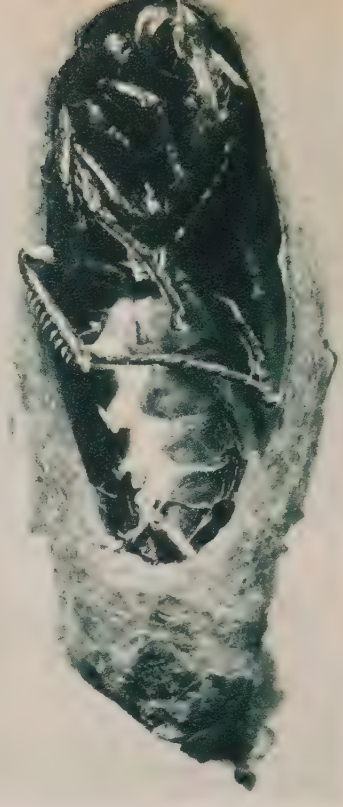
The female *Pedinaspis planatus* is frequently seen in California, but apparently the male has never been described in scientific literature. Little has been definitely learned about the life-history of this wasp.

Inasmuch as the accompanying photographic life-history contains much that is new to Science, I would like to say that this material is based upon the following field and laboratory experience during a period of about three years: The collection and examination of more than 2000 trap-door spider nests and some eighty *P. planatus* cocoons. These figures include only the nests containing *live* spiders or cocoons. As a necessity in studying the complete life history, I also reared in my home laboratory more than fifty of these wasps from the egg to the adult.

It is further pertinent to say that none of these photographs are from posed scenes. All are candid camera shots from natural action.







These wasps have two, and sometimes even three generations a year. Summer life cycles are short, perhaps two months. In winter the larva and pupa may occupy the cocoon for as long as seven months. Above we see what goes on in the cocoon. The pupa develops from the larva, many changes occurring. It is, however, as difficult to say when one becomes the other as it is when a pig becomes a hog. But the goblin-like form we see next is the pupa. When it split out of the larval skin it was transparent and colorless, but the eye is already beginning to darken. In the third picture we have what is almost a wasp. The plates have hardened, the abdomen will shrink and the plates will overlap, forming a flexible, fang-proof armor by the time the adult wasp cuts her way out of the cocoon.

In the picture below we see a wasp, with an unfertilized egg. Yet this wasp is capable of what is known as parthenogenesis—of laying unfertilized eggs that hatch. If she mates her eggs produce both sexes; if she does not her eggs will produce males only. Such an ability has not been known before in a solitary wasp. The process of development is the same as with fertilized eggs, and in the right hand picture above we see a male pupa hatched from an unfertilized egg. The head of the male is smaller than in the female.

When spring is fairly on her way in our eastern woodlands, the bloodroot upraises its blossoms of simple white. The pointed buds that have pierced the matted leaf-carpet are tinged with delicate pink, and beside them are spikes of yet unfolded leaves. Soon the blossoms will open and fall, and the leaves will expand in all their beauty.

The bloodroot, *Sanguinaria canadenses,* is everywhere a favorite. From its trailing rootstocks it can be depended on to send up, year after year, its contribution to the beauty of the landscape. The red juice of the root was used as a dye by the Indians, and by the whites as a medicine in small doses for promoting digestion. But an overdose is dangerous. This is a spirit-of-the-month picture by Marie V. Beals of Elmhurst, Long Island, New York.

THE TADPOLE'S TAIL

By HENRY B. KANE

In his account of a voyage to America in 1663, John Josselyn, Gent., goes into some detail regarding the flora and fauna of that section known as "New-England". Interesting indeed are his accounts, but they are not always accurate. For example, this early naturalist has the following to say on the subject of frogs:

"Frogs too there are in ponds and upon dry land, they chirp like Birds in the spring, and latter end of summer croak like Toads. It is admirable to consider the generating of these Creatures, first they lay their gelly on the water in ponds and still waters, which comes in time to be full of black spots as broad as the head of a Ten-penny nail, and round, these separate themselves from the gleir, and after a while thrust out a tail, then their head comes forth, after their head spring out their fore-legs, then their tail drops off, and growes to have a head and four legs too, the first proves a frog, the latter a water newt. So God is seen in these Creatures which are a part of the Creation."

Any school boy today knows that a newt is a creature

entirely different from a frog. But how many know just what *does* happen to the tadpole's tail?

This series of photographs, showing the entire process, is of a bullfrog tadpole, caught in mid-June of his second year. The first picture shows his broad-finned, speckled brown tail at its best. Over all he measures a good six inches. His hind legs are well developed and his eyes are beginning to show a slight elevation. His mouth is still quite small. In the second picture his tail has begun to disappear. It is being absorbed into the body, helping in the formation of new organs, acting as a food, and contributing its coloring matter to

darken the skin. Meanwhile, the eyes are becoming more and more elevated and the mouth larger. The process continues rapidly until only a black stub of a tail remains in the third photograph. He is really a frog now, although there is as yet no sign of his ears. And last we see the young frog, only twelve days after the first picture was taken, all signs of tail gone, eyes, ears, mouth and legs fully developed.

Mr. Josselyn, Gent., would have quite a task trying to find that tail and watch it grow into a newt! It is to be assumed that this item, like many another in his famous books, was based on hearsay and not observation.

Odd Rocks in the Ozarks

The pictures reproduced on this and the next page are published in conjunction with the article on rock formations in Arkansas' state parks by Inez Hale MacDuff that appears elsewhere in this issue. Pictured first are the curious "turtle rocks," large mound-shaped masses of gray sandstone that are found at various places in Petit Jean State Park. The largest group of the "turtle rocks" appears in the Seven Hollows section of the Park, where about 400 acres of these odd rock-masses are found.

Cliffs 60 feet high wall the corridor leading to Bear Cave, and although they nearly touch part way up, they separate at the base to form the path. Pictures by National Park Service.

The interesting details of the carpet rocks, in which geometrical patterns appear in relief on slabs of sandstone, are shown below. The design is carried out with startling regularity in many places where the rocks have been exposed to the weather. Photograph by D. D. Rayfield.

Among the unique rock formations in Devil's Den State Park is this mass of sandstone, 25 feet long and ten feet high, that contains a large deposit of 90 per cent pure magnesium sulphate, or Epsom salts. The material has flaked from the sides of the rock and has fallen on the floor of the natural cavity to form a thick layer. Photograph by D. D. Rayfield.

Our last picture is that of Natural Bridge, found in the Seven Hollows area of Petit Jean Park. This is one of the larger rock masses to be found in the Park and the arch was formed by water action wearing away the softer portions of the sandstone. The span is about 60 feet from base to base, and at its center rises 40 feet above the ground. National Park Service photograph.

Some Glimpses of Our National Parks

First on this page are shown the rugged Tetons as seen across Jackson Hole, just south of Yellowstone Park. The highest peak is the Grand Teton, barren, bleak, and 13,747 feet high.

Jupiter Terrace, one of the many scenic wonders of Yellowstone, was named after the Roman god of the elements, ruler of rain, wind, thunder and lightning. Atop this massive staircase Jupiter is envisaged as looking down upon the marvels of the Park.

The silver summit of Mount Rainier, Washington, stands more than 14,000 feet above sea level, but geologists have determined that at one time it reared at least 2,000 feet higher, until a great explosion blew the top off the once active volcano.

The timid are not required to take all horseback trips

offered at Zion National Park, Utah, although the sure-footed horses are as much at home on the precipitous trails as old Dobbin is in his meadow back home. This trail leads to Horse Pasture Plateau, a remarkable natural grazing ground more than a mile above the valley. These photographs courtesy of Union Pacific Railroad. Going-to-the-Sun Mountain towers over the road of the same name in Glacier National Park, Montana. Much grading was necessary to construct a roadbed along this slope, and the highway is the only one in the Park that crosses the Continental Divide.

Craggy Notch Top Peak and its jagged, rocky slopes are typical of the scenery in Rocky Mountain National Park, Colorado. This Park, because of its location, probably is the most accessible of all our western parks. Fine roads traverse its great heights and numerous trails bring its grandeur and beauty close to hikers and riders. Photographs on this page by U. S. Department of Interior.

Painters, poets and press agents for years have tried to record the sublimity of the Grand Canyon of the Colorado, greatest example of erosion on earth. But no brush or pen can convey adequately the glory of its color, its incredible depths and heights, or its fantastically sculptured rock formations. Thousands of sightseers annually make Grand Canyon National Park, Arizona, their vacation objective, where accommodations ranging from simple camp sites to the best in hotels are offered. The view shown depicts the inner gorge of the Colorado River as seen from the South Rim between Mojave and Pima points. U. S. Department of Interior photograph.

Canada's Rockies vie with our own in majestic beauty. Here pictured is sheer Mt. Edith Cavell, Jasper National Park, Alberta. Photograph by Canadian Pacific Railway.

Upper and Lower Yosemite Falls, Yosemite National Park, California, combine to make one of the most beautiful and impressive waterfalls in America. The upper fall drops 1430 feet, a height equal to nine Niagaras. The lower fall, immediately below, has a drop of 320 feet. Counting the cascades between, the entire distance from the crest to the valley floor is 2565 feet. The falls of Yosemite are at their best in May and June when the snows are melting, and although their beauty does not depend on the volume of water that pours over them, they are seen to best advantage before July 15. Atchison, Topeka and Santa Fe Railway photograph.

The Great White Throne, towering 2500 feet above the canyon floor, is one of the main attractions at Zion National Park, Utah. It is practically unscalable, and only one person has viewed the wonders of Zion from its summit; Park Service regulations now forbid attempts to climb the sheer cliffs. Union Pacific Railroad photograph.

Many of us have seen pictures of Yellowstone Falls as viewed from Artist Point, but few, we believe, have seen a picture of the point itself, from which vantage point the beauty of the Falls and the Grand Canyon of the Yellowstone are best observed. Photograph courtesy U. S. Department of the Interior.

The rugged country surrounding this valley, gouged out by ancient glaciers and smoothed by erosion, is typical of the mountain country north of Yellowstone National Park, Wyoming. This photograph was taken from near the summit of Red Lodge Highway, Beartooth Mountains, Montana. Snow remains well into the summer on its upper slopes, and such small birds as prefer to nest there must bide their time. To the south is Yellowstone Park, one of the most successful wildlife refuges in the world. Here the forests and mountain meadows are undisturbed, and no domestic animals ravage its vegetation. The wild creature may not be seen by the traveler who keeps to the main roads, but the quiet watcher on the trail may see deer, bears and elk, or perhaps even antelope, moose, mountain sheep or bison. Here also more than 200 species of birds live natural, undisturbed lives, as well as many species of small mammals.

Only a part of the underground wonderland that is Carlsbad Caverns National Park, New Mexico, is shown here. This is the entrance to the King's Palace, where the weird stalagmites and stalactites approach each other, or even meet, between floor and ceiling. Photographs by the U. S. Department of the Interior.

No visitor to Glacier National Park will wish to miss beautiful Lake McDonald, a blue diamond set amid ermine capped peaks that form a breathtaking background. Photograph copyright by Hileman.

Millions of years ago, in south-central Oregon, a mighty volcano reared its peak high above the surrounding mountains. Now, either because of a series of explosions or because the molten lava within engulfed the peak, the mountain is no more. In its stead is Crater Lake, six miles wide and 2000 feet deep, with no visible inlets or outlets. Visitors to Crater Lake National Park, accessible nearly the entire year, take the 35-mile trip around the rim of the crater under the leadership of a naturalist and see, besides the constantly changing colors and contrasts of lava cliffs and blue water, the Phantom Ship, pictured here, so called because of its resemblance to a ship under sail and its ability to disappear in certain lights by blending with the crater walls. Wizard Island also is notable.

Our last picture is that of azaleas in bloom on the upper slopes of Andrew's Bald, Great Smoky Mountains National Park, North Carolina. Photograph copyright by George Masa. All photographs on this page courtesy of the National Park Service.

Nesting Birds Here and There

This elusive yellow-billed cuckoo was photographed on its slight nest on a low limb. A dummy camera, set only thirteen inches from the nest, gained the bird's confidence. Photographed near Somerset, Pennsylvania, by R. A. Baker.

Although our common blue-jay is familiar when in need of food, it is shy when nesting. This one, like the cuckoo, was first educated by a dummy camera. Photographed by R. A. Baker near his home at Dayton, Ohio.

These twin ruby-throated hummers will soon leave their snug nest, and start southward for their winter home in Central America. Photographed at San Antonio, Texas, by W. E. White.

Audubon's caracara, a vulture-like hawk, reaches our country only along the Gulf Coast. Here is shown a young one, only seven days out of the egg. This harmless bird, now sadly reduced by wanton destruction, should be preserved for its interest as a picturesque ornament. Photographed by Wray H. Nicholson, Orlando, Florida.

The ground dove, *Chaemepelia*, smallest of our species, is native along the Gulf Coast. This male bird, taking the place of his mate on the nest, also was photographed by Wray Nicholson.

★ Conservation ★

A part of Nature Magazine each month is devoted to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

★

PROSPECTS FOR WATERFOWL ★

Definite indications as to how the winds may be expected to blow for North American waterfowl during 1938 were to be seen in the discussions at the recent North American Wildlife Conference in Baltimore. Much time on the four-day program was devoted to our ducks and geese, the situation in which they find themselves today, and what they may expect in the future.

The discussion of the hows and whys of duck hunting regulations was prefaced by sessions devoted to the present status of the birds and the progress of migratory waterfowl refuges. Increase in the numbers of ducks and geese was reported—overoptimistically, we believe—by United States authorities and more conservatively by the spokesman for Canada. Rapid promotion of the waterfowl refuge and public shooting grounds program also contributed to what we feel is an overconfident attitude regarding the safety of these birds. Perhaps some species of waterfowl have enjoyed a moderate increase. Also, given time, the refuge program, if backed by adequate regulations, will undoubtedly be a most helpful factor in maintaining a supply.

None of these considerations, however, warrant the overconfidence that is arising in some quarters. In fact, Dr. Ira N. Gabrielson, Chief of the Biological Survey, reported that he has received many demands for the loosening of restrictions, even to resumption of spring shooting. That there is going to be an organized drive for easing the regulations was indicated at the Conference by John C. Huntington of More Game Birds in America, Inc., who declared the restrictions of 1937 to be unfair, impracticable and impossible of enforcement. Dr. Gabrielson, in a rebuttal, declared that he would never knowingly put his signature on any regulations that would permit the taking of more birds than the annual increase. At the same time he did indicate the somewhat disquieting fact that the 1938 regulations would be based in part upon the recommendations made by representatives of the Game Commissions of the several States. It is no reflection on the personal integrity of these gentlemen to point out that political and sportsman pressure must, in many cases, operate to prejudice them in favor of regulations that would give the duck hunter a better "break" than the birds. This restriction of representation to State officials seems to us to be a doubtful improvement on the Advisory Board system (now abandoned), on which a majority of state representatives was maintained, but where the birds were always zealously defended by at least a few members. We feel, moreover, that the Biological Survey, working alone, is the agency best qualified to define the rules of the waterfowl game for 1938.

It is obvious, therefore, that there is to be a demand for greater waterfowl hunting privileges. This will come from strong elements among organized sportsmen and from some State officials. It will include demand for return of baiting and the use of live decoys; season dates that will assure longer and more advantageous shooting; and removal of protection for certain seriously reduced species whose numbers have increased, if at all, only slightly.

While we still believe that a series of closed seasons represents the *only guarantee* of the future security of our migratory waterfowl, and the only assurance of reasonable duck hunting in the future, we recognize that an even greater emergency than now exists may be necessary to bring this about. The threatened loss of revenues from licenses and duck stamps will always, of course, act to postpone closed seasons. It is, therefore, the responsibility of every true conservationist, and every sportsman with sufficient breadth of vision to be worthy of the name, to support, rather than oppose, the Biological Survey in regulations calculated to increase further, even though slowly, our ducks and geese. There must be no return to the many abuses of the past.

CONSERVATION OR INTERIOR?

Strong opposition, from various viewpoints, having developed against the government reorganization bill, the Senate Committee that has the bill in charge, as this is written, is busily modifying the measure. One provision that has been eliminated is the proposal to change the name of the Department of the Interior to Department of Conservation. The bill does, however, still permit the transfer of various agencies concerned with natural resources, but it is expected that it will be amended in the Senate to include the specific exemption from transfer of at least the Biological Survey, Forest Service and Soil Conservation Service.

While, on the surface, such developments appear negative so far as much-needed coordination is concerned, we believe that the eventual result will be definitely constructive. The discussion that has been aroused has set conservationists to thinking. This is what the American Nature Association hoped would happen when it proposed, two years ago, the creation of a super-bureau within the Department of Agriculture to coordinate administration of our renewable natural resources. This proposal was put forth primarily as a basis of discussion. It was based on the single conviction that administration of renewable natural resources should be separate from non-renewable.

Since that time the Brownlow report appeared and the Administration based a bill upon it. Others have come forward with alternative proposals. These efforts are positive and constructive in character. We believe that from it all can be evolved a specific piece of legislation seeking the goal of efficient and integrated administration. Further discussion of this question is contained in *The American Nature Association Quarterly Bulletin,* now available. We will heartily cooperate in seeking a proper and direct answer to this important conservation question.

•

BILLBOARDS AND VALUES

One of the arguments advanced by the billboard industry in defense of the rural billboard is that it provides the farmer with a source of income. There is no doubt that the modest rentals paid for the privilege of erecting boards on farm property do appear to some rural property owners like "finding money". In the larger social and economic senses, however, there are considerations which, in our estimation, greatly outweigh the small profit to the individual. These are, to be sure, in the realm of intangibles and are difficult, if not impossible, to present in dollars and cents for comparative purposes. Nevertheless, they are vitally important when we consider the whole question of economic and esthetic damage done by the rural billboard.

It is, of course, obvious that the value of rural property is enhanced by the building of a highway contiguous to it. This highway is built with public funds raised by general taxes. The rural property owner may be assessed some benefits, but in most cases these costs are far below the actual values added to the property by the construction of the highway. The fact that the highway *is* there, and that, in the opinion of the billboard industry, enough people travel over it to make billboards along its route worth while, is what brings about a location-rental value. The taxpayers have made this by-product of farming possible, and they now suffer the consequences of the commercialization of the rural landscape.

But what happens in the case shown by the accompanying picture? A city dweller has elected to move out and build a home in the country. He has built an attractive place; and has put money and effort into landscaping the grounds. He has a considerable investment; attractive rural views from his front porch; healthful and beautiful surroundings. Then the billboard industry discovers an attractive bit of landscape on which it can put up a large poster board. It is on a farmer's property across the highway. The home-owner has no way of erasing this eyesore from the rural landscape. The billboard industry doesn't care. Yet here is obvious, yet intangible, property damage. The home-owner must inevitably take a loss, if he is to sell his property, because of this intrusion, with relation to which he has no legal recourse. And the loss he must take will be far greater than the small revenue the adjacent property owner will derive from a location rental, even over a period of many years.

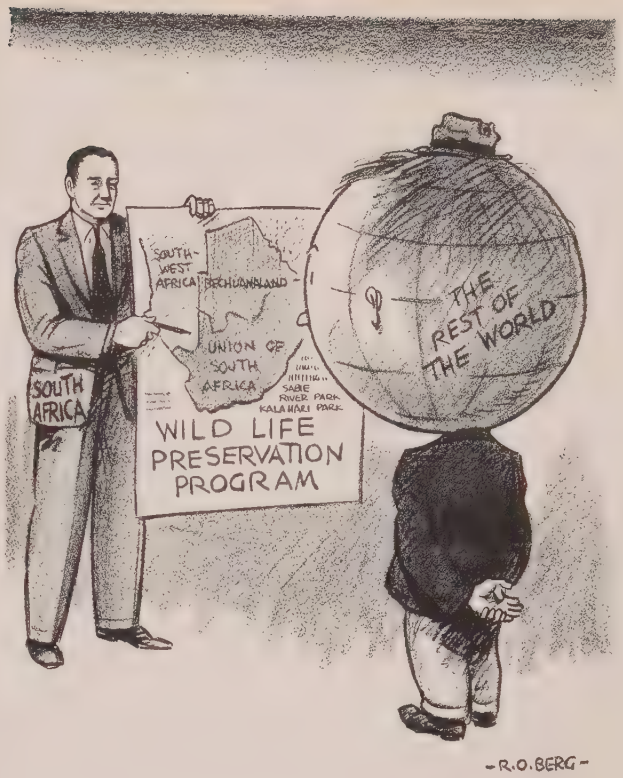
Such conditions may be forestalled by rural zoning, an important subject to which the second issue of *The American Nature Association Quarterly Bulletin* will be devoted. They may also be met by taxation, capitalizing the value of the land on which a billboard is erected on the basis of the annual revenue derived, and taxing it accordingly, and also taxing the billboards as personal property. Some method must be devised to offset such indifference to individual and public welfare on the part of the billboard industry.

PROFIT IN PRESERVATION

John Bull has proved that live animals pay in South Africa

By STEPHEN HAWEIS

Illustrated by Russell O. Berg



NAPOLEON said the English were a "nation of shopkeepers." He did not add, as he might have done, "very good shopkeepers." The game laws of England are notoriously severe upon poachers, and while sport, or the slaughter of wild animals, is organized and widespread, circumstances make it possible there to forbid anybody to kill game that he does not also preserve and pay for. Between the purchase of a gun, and the right to kill anything except vermin with it, is quite a step. Sport in England is also restricted to a very small proportion of the population, a condition that is impossible in the United States. But in England's colonies —branch businesses—other arrangements are made to fit conditions and, like good shopkeepers, the English frequently take stock, and notice when they begin to run out of certain commodities.

The improvement of firearms during the past hundred years has inspired wholesale slaughter of both men and animals. Whole species have been exterminated, but South Africa decided many years ago that it was poor business to let that continue. South Africa leads the world in game preservation. In 1898 the Transvaal Volksraad, under President Kruger, set aside a huge tract along the Sabie River with the idea of preserving wildlife and stemming the tide of unthinking destruction. Eight thousand square miles of the Park now protect nearly every species of animal in South Africa, and today, within twenty minutes of comfortable rest camps, anybody may be obliged to slow down his car to avoid running over a slightly supercilious lion or leopard that has no fear of man, and little respect for people who go about on wheels tooting their own trumpets. In 1934 about six thousand cars entered the Park and twenty thousand visitors spent days and weeks watching the wild, and were content with watching.

It is possible to enjoy Nature without committing unprovoked murder, and it is being realized so well that Nature alive pays better than sport that dozens of other game reserves are coming into existence. Kruger Park is the largest, but Kalahari Park, in the Gordonia district of the Cape, comes a respectable second, with its two million acres, in which the Government supplements the natural water supply with wells and windmills. There was, of course the usual yelp that the protection of animals was silly sentimentality, that animals enjoyed being hunted and increased far more and were healthier when thousands of them were shot and wounded than when left alone—merely grazing and growing, eating their heads off in idleness. But that is old stuff in South Africa although it still has a familiar ring in our United, but in some ways benighted, States. It is not sentimentality, but the unbounded success of Kruger Park that has caused Natal to create half a dozen parks ranging from sixty thousand to ten thousand acres. Orange Free State has comparatively little suitable territory, but even here there are two small areas where animals are rigorously protected. Everywhere the game laws are not only existent, but strictly enforced—they find it good business. Strange as it may sound to some American ears the animals have not suffered at all by the extermination of their persecutors any more than cities perish when a bunch of gangsters is rounded up and added to the national collection.

In 1934 the Wild Birds Protection Bill was passed making it illegal to trap or otherwise capture wild birds for sale throughout the Union. The export of birds—except under specified rules and for scientific purposes—was also prohibited although it had become a lucrative business of considerable proportions. Sportsmen will be astounded to learn that this has not done anything to exterminate birds; on the contrary, bird watchers report that the larger birds are coming back into districts where they have not been seen for years. Pelicans may be seen feeding in the swamps of the Black River within four miles of the heart of Cape Town. Flamingoes come every year to the larger lakes and herons and egrets nest in the centre of one of the oldest residential sections of the city. It is as though moorhens should suddenly appear in upper Fifth Avenue, New York.

From general protection of all animals to special protection of particular animals required no great effort of

imagination. In the early days of the Cape the bontebok roamed in immense herds over the "sand veldt" districts of the Colony. It is a beautiful animal, strongly marked in brown and white and with well-shaped horns. Its name signifies "pied". The great numbers of them, the ease with which they could be shot wholesale, and their suitability for making dried meat were their undoing. The people shot them for sport and for market until the herds were reduced and began to dwindle to the point where they were not hard to count. By 1900 there were only two small herds left. Twenty-five years later there was one herd—if you can call thirteen derelicts a herd. These appeared on the farm of a family named Albertyn, who kept stock. The Albertyns perceived that the bontebok could not compete in grazing with their domestic animals, but they did not instantly reach for a rifle to slaughter them. What they did was to buy a small farm adjoining their land and give it to the antelopes so that they could live in peace. This farm, with its last thirteen bontebok, was presently taken over by the Government. Plenty of water, and freedom from the close-cropped lunches with the sheep and cows, enabled the little herd to survive. In 1934 the bontebok club membership had increased from thirteen to twenty-four. In 1935 they were in the thirties and had already divided themselves into three troops that keep strictly to themselves. The reason of the subdivision is probably a matter of morals for one party is as wild as they come while the other is, reprehensibly, tame! The largest of the troops is the tamest: a horseman can approach its bucks within twenty or thirty yards, but the second largest troop is inordinately timid and cannot be approached at all without an immediate stampede. The third group is probably socially inferior in some way not noticeable to man.

That, briefly, is the story of one animal saved, just as, through the energy and foresight of a few, the American bison were saved. These stories give us hope that American antelopes, sheep, eagles and even ducks will be saved for posterity.

"But what good are they, to posterity or anybody else, if you don't shoot 'em?" we hear.

John Bull knows, and the vast national game reserves of his empire are a good part of the answer. Conservation is an ideal, a tribute to Beauty, the outward and visible sign of a prayer to God, but—if that cuts no ice with you, Brother Gun, lemme tell you—it's good because it pays. It pays better than "Sport". It's proved—now laugh that one off!

●

The Onager, Wild Ass of Persia

By ERNST SCHWARZ

WILD ASSES are still found in northeast Africa and on the plains and plateaus of Central Asia. The African ass once ranged all over Europe, but became extinct there during the last advance of the ice. This type became the ancestor of the domestic donkey.

The wild asses of Asia, however, have never served man, except that he hunted them, as he hunted other animals, for meat. Since the invention of firearms these animals have become scarce in many places, and almost extinct in Arabia, Mesopotamia and Persia. They are still found in some parts of anterior Asia, and also in northwestern India, in the Kirghiz steppes, in Mongolia, and on the highland of Tibet. In these wide areas they vary a good deal, especially in size. Those found in Arabia are only about three feet four inches at the shoulder; but the Central Asiatic forms are much taller, exceeding their small cousins in height by more than a foot.

The Asiatic ass was known to the ancients as the onager; it has many local designations, such as kulan in Turkestan, dziggetai in Mongolia, and kiang in Tibet. These animals live in troops, led, like the wild horses, by a stallion. They are cautious and avoid man. Their speed and endurance are notable. When hunted with motor-cars it was found that they could maintain a speed of thirty miles an hour for at least half an hour. This is far more than any thoroughbred race-horse could do.

PHOTOGRAPH COURTESY OF BERLIN ZOO

Zoologists place the onager between the true or African ass and the horse. Its color is buff or brown, as in the wild horse, not gray, as in the true ass; and in the size of its ears and hoofs it stands between the two.

Things to Think About

National Wildlife Restoration Week has been designated by proclamation of the President as the week of March 20 to 26. The purpose of this observance is to focus public attention on the generally precarious situation of our wildlife resources today. Various activities are planned for the week designated, but one of the most effective popular-appeal moves in this connection comes from the General Wildlife Federation through its president, Jay N. Darling. This is in the form of a sheet of one hundred beautiful wildlife stamps done in full color by "Ding" and presenting sixteen different birds or mammals. Across the face of each stamp is the slogan "Help Restore Our Wildlife". Each set sells for one dollar and the funds thus raised will be used to cover the expenses of the current campaign for the wildlife week, and to carry on the servicing activities of the Wildlife Federation for the coming year. These stamps are available through Junior Chambers of Commerce, Garden Clubs, Women's Clubs, and other groups affiliated with State Wildlife Federations. A proportion of the funds derived from the sale of stamps by organizations will be retained by these groups for their own work. The sets are also available from the headquarters of the General Wildlife Federation, Investment Building, Washington, D. C. Send your dollar, and say how you wish it to be spent.

• • •

Interesting commentary on the hazards of hunting is provided by the Pennsylvania Game Commission's compilation of accident statistics covering the years from 1924 to 1937, inclusive. During that time there were officially recorded 667 fatal accidents and 3489 non-fatal misadventures. Also, over these fourteen years, 7,525,287 hunting licenses were issued.

• • •

Lyon County, Iowa, has increased its bounty on foxes from one dollar to three dollars for adults, and from fifty cents to one dollar for fox pups. From December 20, 1937, to January 12, 1938, there were 139 foxes turned in for bounty. Apparently the intent now is to eliminate the fox population of this Iowa county. In the same release of the Iowa State Conservation Commission in which this bounty policy is announced, there is to be found a wise piece of advice pointing out that any sort of predator control should be based on study and an accurate knowledge of the facts. We wonder what study was made in Lyon County.

• • •

Conserving Our Natural Resources is the title of a leaflet listing material useful to students and discussion clubs and published by the American Association for the Advancement of Science. Brought out with the cooperation of the Enoch Pratt Free Library of Baltimore, this presents a basic bibliography for which completeness is not claimed. Copies are available from the American Association for the Advancement of Science, Smithsonian Institution Building, Washington, D. C., for a three-cent stamp.

• • •

A cooperative agreement for the establishment of a wildlife research unit has been made between Pennsylvania State College, the State Game Commission and the U. S. Biological Survey. This makes the eleventh state to join in the program, which goes under the general title of game management.

• • •

A new idea to stimulate picking on the poor old crow has been devised by the versatile State Game Department of Maryland. A crow with a metal leg band bearing the number 17 has been released and the hunter killing it will get fifty dollars. Another crow banded with the number three is worth twenty-five dollars—dead—and there are others with bands that bring the hunter ten, five, two and one half, and one dollar respectively. It sounds like Bingo, or maybe the Irish Sweepstakes idea, to us.

• • •

A press release from the Biological Survey announces that during the year 1936 the sportsmen of the United States and Alaska numbered 6,658,158, and that they paid out about $11,000,000 for licenses and duck stamps. These figures represented a considerable increase over those for the previous year, a fact that seems to the survey to be reason for congratulation. The popularity of skeet, and the consequent urge to apply the skill thus acquired to the vanquishing of living targets, is advanced as one of the reasons for more hunters taking the field. The other dominant reason given, the improvement of waterfowl conditions, is equally incomprehensible to us as affording any reason for optimism, since we have been led to believe that any increase in the numbers of waterfowl was intended for addition to the existing breeding stock. The line of reasoning that runs through the entire release is so interesting that we propose to discuss it more particularly in an early editorial.

• • •

It is comforting to know that the billboard industry is now dedicating itself to uplifting our appreciation of art. This responsibility is being assumed through the printing of a poster reproduction of Gainsborough's "The Blue Boy", which will adorn vacant boards. This gesture is calculated to divert attention from the fact that many boards are offensively placed on the rural landscape and otherwise to surround the industry with an aura of esthetic appreciation. It is an interesting variation of the practice of donating billboard space to churches, civic organizations, state departments and charitable enterprises, to the end that the individuals concerned with these organizations will be under obligations not to fight the encroach-

ments of the industry on the rural landscape. Endorsement by women's clubs and garden clubs is being sought for "The Blue Boy" idea. The Maine Federation of Garden Clubs received the proposal with vast amusement and replied to it with a resolution stating that no billboard, however adorned, could add to Nature's art as found in rural New England.

• • •

WISCONSIN GAME

AN INTERESTING but sad exhibit is the table showing the game killed in Wisconsin in 1935 and 1936, pridefully printed in the bulletin of the Conservation Department for July-August, 1937.

	1935	1936
Deer		29,676
Bear		273
Cottontail Rabbits	1,429,192	935,880
Snowshoe Rabbits	178,846	152,736
Jackrabbits	17,605	16,633
Gray Squirrels	745,873	427,341
Fox Squirrels	428,448	270,768
Red Squirrels	148,888	103,274
Raccoon	8,889	6,697
Opossum	5,306	1,719
Red Fox	4,288	3,470
Gray Fox	19,575	13,381
Bobcat	298	263
Pheasant Cocks	135,717	144,920
Hungarian Partridge	23,252	15,516
Bobwhite Quail	10,848	No open season
S. T. Grouse and Pr. Chicken	33,476	No open season
Ruffed Grouse	72,778	No open season
Jacksnipe	17,448	38,786
Rails	241	601
Woodcock	2,789	2,350
Mallards	167,693	196,259
Black Duck	14,737	16,701
Green-winged Teal	22,602	53,498
Blue-winged Teal	18,409	34,642
Pintails	14,724	19,777
Widgeon	8,663	13,949
Bluebills	121,969	181,242
Canvasback	19,387	No open season
Redhead	9,496	No open season
Coot	172,184	205,306
Other Ducks	10,895	12,644
Canada Goose	593	1,685
Snow Goose	295	1,563
Blue Goose	105	453
Other Geese	100	278
All other small game	1,854	17,138
Total estimated kill of all species	3,867,463	2,919,419

It has been evident for some years that the cottontail rabbit has become the most important game animal in some sections, but we now find the squirrels, even the little red squirrel, the chickaree of the pines, competing for that honor. After noting that more than a hundred thousand of these little fellows fell before the "sportsmen's" guns, we cannot help wondering what were the species that made up the seventeen thousand "small game". Perhaps they were chipmunks and sparrows. It surely is to laugh, when grown men are willing to consider the red squirrel a game animal. As the Indian said: "Soon white man trap the chipmunk and the wood mouse and other tiny fellows who live among the tall grass of the meadows, and beneath the forest floor."

The game officials of Wisconsin are highly jubilant over the fact that in the case of most species the kill for 1936 was greater than in 1935. But to us their exultation over a 37 percent increase in the kill of waterfowl is especially hard to understand. At a time when even the most blindly optimistic of the advocates of continued shooting of waterfowl admit the necessity for a reduced kill to avert extermination of some species, these sanguine conservationists seem to consider an increased kill a good sign.

• • •

A NEW CROW TRAP

THE Biological Survey has recently announced, in an illustrated release, the perfection of a trap for catching wintering crows in quantity. For fifty years the Survey has been studying the crow, and on several occasions has issued reports that, while advocating the removal of individual crows that have proven to be unduly destructive, have given the bird credit for being a friend rather than a foe of the agriculturist, and insisted that indiscriminate killing is not warranted. This attitude of mercy, however, and the evidence that supported it, have been lost on the majority of hunters and their spokesmen, and crow killing campaigns that involve methods that are cruel, wasteful, and indiscriminate in their results, have been widely recommended and carried on *ad nauseam,* especially during the past few years.

With most of the State game agencies, many sportsmen's Associations, several ammunition companies, and thousands of individuals actively reducing its ranks with guns, traps, poisons and dynamite, mainly on its reputation as a destroyer of game, it would seem that the crow was already sufficiently harassed, and that small game species should be on the increase. It has been evident for some years that the crow, especially in the East, has been greatly reduced in numbers, but we look in vain for any increase in its supposed victims.

Now comes the Survey with this attack on a new front. After detailing the good points of its trap, the Survey somewhat ironically alludes to the many good qualities of the crow, especially in its spring activities, and advocates caution in trapping. This seems to us like pointing out a songbird to a ravenous cat and then asking pussy to be gentle in her methods.

We are sorry to note the Survey's advocacy of a plan that is bound to bring undeserved encouragement to all agencies that are striving to exterminate this interesting bird. Not that we fear actual extermination, for we believe that the crow will exist long after the hunters have put away their guns for want of legitimate game to pursue; but adding even slightly to present crow-killing methods looks like small business.

Rocks of the Ozarks and Ouachitas

By INEZ HALE MacDUFF

Illustrations supplementary to this article will be found at the center of the rotogravure section in this issue.

PHOTOGRAPH BY D. D. RAYFIELD

"GATES AJAR" ROCKS IN PETIT JEAN STATE PARK, ARKANSAS

These two mossy lichen-covered boulders guard the trail that leads to the overlook from which Cedar Falls, another of the charms of this park, is to be seen by visitors

ROCKS of Biblical times that "cried aloud on the hillsides", in the language of the psalmist, have a present-day counterpart in rock formations of the Arkansas Ozarks and Ouachitas, minor mountain ranges of the southwest that are second in age to only one mountain range of the United States, the Appalachians. As regards their present surfaces, the two are equally ancient. Here hundreds of strange rock formations reveal a story of relentless war by water and elements against the residue left in the beds of successive oceans in the ages long past.

Inaccessibility of the area has prevented detailed study until recent years, but activities of the National Park Service have now placed many interesting examples within easy reach of automobile or hiking parties. Arkansas state parks are being developed by the National Park Service with special funds for this purpose. They will be maintained by a newly-appointed State Park Commission, and will provide natural laboratories for intensive study of the sandstones of the Arkansas Paleozoic area.

Outstanding among these reservations is Petit Jean State Park, oldest and most highly-developed of the six state parks in the group. It is located immediately west of the Arkansas River on the fringes of the Ouachita Mountain range, about one hundred miles northwest of the center of the state. The park occupies about 2000 acres on the top of Petit Jean Mountain, a mesa-like plateau that is an erosion remnant of an early range. Rising abruptly from the flat, fertile Arkansas River valley, the mountain, in shape somewhat like a horseshoe, is about fourteen miles long and five miles wide at its broadest point. A deep, rock-walled canyon runs throughout most of its length, and provides many graphic demonstrations of the effect of time and weather on ancient rock formations.

At the edges of the canyon and around the mountain's outer rim are sandstone ledges that afford overlooks for scenic views within the canyon and across the wide sweep of the Arkansas River valley beyond the mountain. On the higher parts of the mountain the Hartshorne sandstone appears in these shelf-like outcroppings, and at a lower level the Atoka sandstone fringes the mountaintop in a similar way.

CEDAR FALLS, PETIT JEAN STATE PARK

Cedar Creek cuts through this high rock-wall, to fall 105 feet into a round pool

PHOTOGRAPH BY D. D. RAYFIELD

Individual rock formations in the area are unique in form, and many of them are difficult to explain except as evidences of the effects of erosion and water action on pliable material of early ocean beds. Among the smaller formations of greatest interest are the turtle rocks and the carpet rocks, pictures of which appear in this month's rotogravure section.

Many geologists believe that the queer pattern of these carpet rocks is the result of the drying of the mud of early ocean beds, the cracks of which were filled by other deposits, and that this cracking and filling process continued until the mass of matter became the symmetrically marked sandstone of later ages.

The Indian rock house, a superbly proportioned natural shelter in a sandstone ledge overlooking the canyon a short distance above the falls of Cedar Creek, is another feature of much interest. The cave is about one hundred and fifty feet long and one hundred and twenty-five feet deep, with an opening about sixty feet high at the front. Its roof slopes gradually back to meet a level earth floor, and it combines the advantages of abundant light and air with perfect shelter.

Rocks that command attention for their imposing size and contour are located along and near the Palisades. Sandstone bluffs overlooking the canyon afford a sweeping view of magnificent scenery to the west, where the broad Arkansas River winds through miles of productive valley land, and the long Ozark mountain ranges encircle the far horizon in blue haze. Many rocks in this formation jut out past the canyon's topmost ledge for a considerable distance, adding to the rugged relief of its skyline.

A "gates ajar" formation in rock appears on a trail to one of the sandstone overlooks from which Cedar Falls is seen. These two rocks, twelve to fifteen feet in height, rising from the slope near the trail, are covered with lichens and mosses which are a lure to the botanist.

Cedar Falls, spectacular and beautiful point at which Cedar Creek plunges one hundred and five feet into a cauldron-shaped rock-basin, is bordered by steep rock walls nearly four hundred feet high at some points. These are perhaps the best of the mountain's many examples of early rock formation for study. The creek, rising at the other end of the mountain, and fed by about forty small springs, falls into a round pool at the bottom of the "bowl". Many large rocks, dense tree growths, and clumps of smaller bushes line the course of the stream below. Coloring of the rock walls differs with their mineral content and with the nature of the lichens and other vegetable growths on their faces, varying from gray and dull green to vivid reddish-orange and sulphur-yellow.

INDIAN ROCK HOUSE

Another of the interesting features of Petit Jean State Park. This natural cave is one hundred and fifty feet long, one hundred and twenty-five feet deep, and sixty feet high. It is on the bluff above Cedar Falls, which is shown on the preceding page

PHOTOGRAPH FROM THE NATIONAL PARK SERVICE

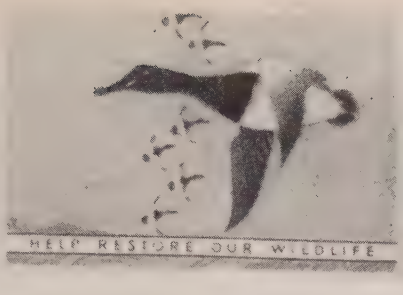
Many other interesting sandstone formations are found in Devil's Den State Park, a reservation in the Ozarks of extreme northwestern Arkansas. Above the valley in which the park's service center is located, many sandstone areas are found, the best known being the "den" from which the park takes its name. Here an opening six feet high and five feet wide provides a path that leads downward into the mountain, where a crevice large enough to admit a man appears in the rock. The cave has been explored for three miles, and it is believed to lead into similar passages with outlets on the opposite side of the mountain. It does not contain a stream, and neither vegetable nor animal life has been found there.

Shale-like formations have filled ravines or crashed down hillsides at many places in the park, indicating surrender of the soft limestone to pressure. Large trees and many small trees and shrubs are rooted in these areas.

An awe-struck eight-year-old visitor peered up at a rock-strewn mountainside in the park one Sunday, marveling at its disorder on a gigantic scale, and sighed, "Gee, I bet God got tired when he got this far, and just quit."

•

Copies of *The American Nature Association Quarterly Bulletin*, Volume 1, Number 1, containing an analysis of conservation problems, are available to all members of the American Nature Association. A note or post card request will bring you a copy of this 32-page bulletin.



THREE OF THE SIXTEEN DIFFERENT STAMP SUBJECTS IN THE RESTORATION WEEK SHEETS

Reproduced in sets of 100 stamps and printed in full color, these should effectively call attention to the need of wildlife restoration. Fuller details on page 237

"DING" LEADS AGAIN

OVER his protest and because his leadership is vitally needed, Jay N. Darling was re-elected president of the National Wildlife Federation on the concluding day of the four-day North American Wildlife Conference in Baltimore. Following introduction of youthful representatives of Boy Scouts, Girl Scouts, Campfire Girls, 4-H Clubs and Future Farmers of America, and a report on the plans for observance of National Wildlife Restoration Week, March 20 to 26, "Ding" reported the progress of the Federation and outlined hopes for the future. These hopes are largely predicated on the funds raised by sale of the beautiful wildlife stamps that he hoped would make it possible for his famous "bow-legged girl of wildlife conservation to put on a party dress and go to the ball."

At a closed session of delegates, the name of the Federation was changed from General Wildlife Federation to National Wildlife Federation; the various constituent organizations were urged to get behind effective legislation to check pollution; Mr. Darling was re-elected president; William L. Finley of the American Nature Association, David A. Aylward, Massachusetts Game and Fish Commissioner, and W. B. Jones, Montgomery, Alabama, geologist, were made vice-presidents; Carl D. Shoemaker was continued as secretary.

The first three days of the Baltimore meeting were devoted to the Third North American Wildlife Conference held under the auspices of the American Wildlife Institute. General sessions devoted to broad issues ran concurrently with technical sessions concerned with reports of biological researches and game management studies. All these will be published in the printed Transactions of the Conference that will be brought out by the American Wildlife Institute, Investment Building, Washington, D. C. Orders may be placed at one dollar a copy.

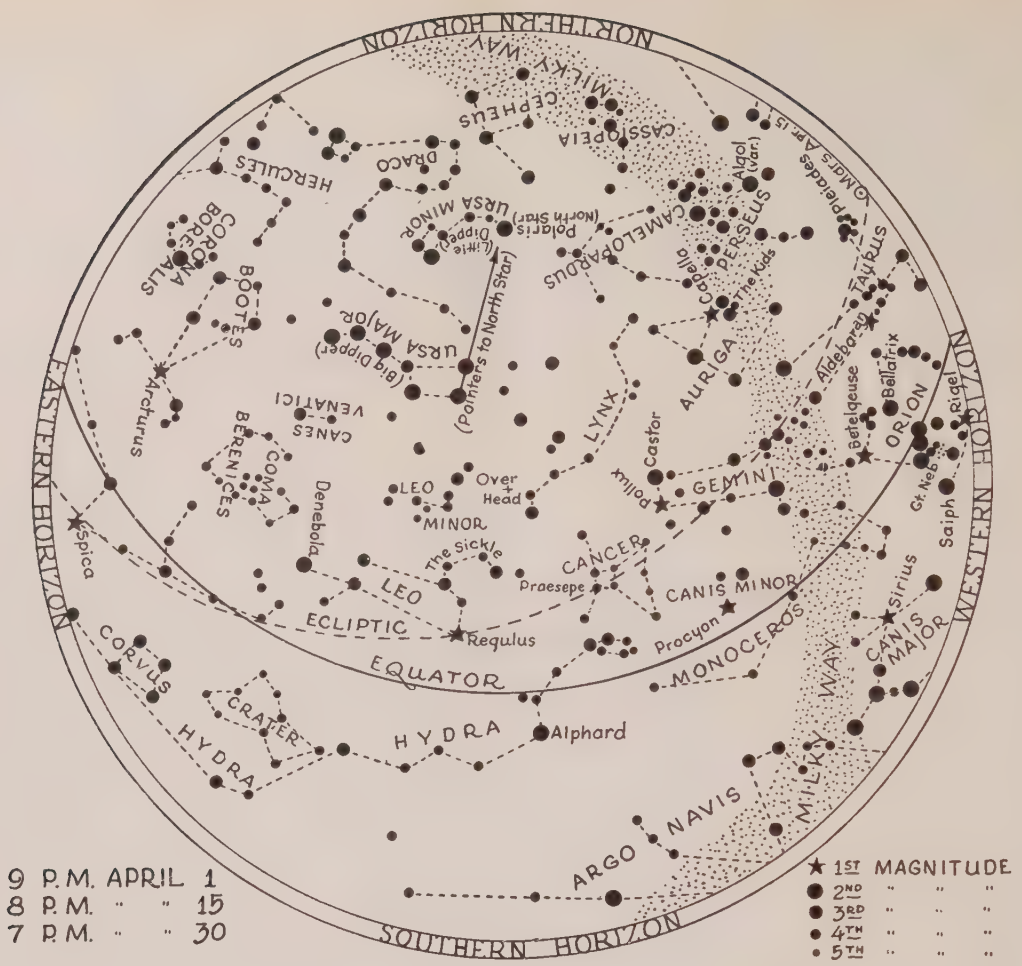
Following a panel system comprising varying viewpoints, subjects presented included the need of conservation education in the schools, general progress in wildlife research, the Pittman-Robertson Act, pollution, mosquito control, drainage and reclamation planning, maintenance of fish crops, waterfowl status, state cooperation in enforcing the Migratory Bird Treaty Act, the Federal refuge program and waterfowl shooting regulations. Discussion from the floor followed the panel presentations.

Mosquito control, which has brought about extensive drainage of marshes at the expense of large and important areas of wildlife habitat, provided one of the liveliest sessions. With Clarence Cottam of the Biological Survey and William Vogt of the National Association of Audubon Societies on one side, and F. C. Bishopp of the Bureau of Entomology and Dr. L. L. Williams of the U. S. Public Health Service on the other, the dubious benefits of this work came in for complete and sometimes acrimonious airing. One thing, certainly, was brought out, and that was the great need for more application of methods for controlling mosquitos biologically.

The entire third day of the Conference was devoted to migratory waterfowl. Maryland being a noted duck-hunting State, this session was attended by many local nimrods and other beneficiaries of the "industry," hoping to hear encouraging reports. Fred C. Lincoln of the Biological Survey pleased them with optimistic reports of waterfowl increase, although Hoyes Lloyd of Canada was less sanguine as to population, and Juan Zinser of Mexico presented a disheartening picture of the problems he faces in his country.

Following a report on the progress of the Federal waterfowl refuge program by J. C. Salyer, a sound discussion of the subject came from H. D. Ruhl of the Michigan Commission of Conservation. While in hearty support of this idea, he declared that it is a mistake "to oversell refuges and depend upon them alone," adding that the refuge system "is better than the sportsmen deserve in view of their lukewarm support of the waterfowl program."

Discussion of waterfowl shooting regulations provided ample argument through a panel consisting of Dr. Ira N. Gabrielson, Chief of the Biological Survey; John C. Huntington, president of More Game Birds in America; John H. Baker, National Association of Audubon Societies, and I. T. Quinn, Conservation Commissioner of Alabama. (Further comment on this (Continued on page 252)



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

Largest of Stars Is a Cosmic Ghost

By ISABEL M. LEWIS

ONE of the most remarkable recent astronomical discoveries has been made by Dr. Otto Struve, director of the Yerkes Observatory, and his associates, through their investigations of the nature of the light changes of the variable and double star Epsilon Aurigae.

The companion of Epsilon Aurigae is not visible to the eye because its radiations are in the infra red. It is, therefore, a dark star, but its presence is known because it periodically eclipses the light of the star about which it makes a twenty-seven-year revolution. When the dark star comes between us and the brighter component it shuts off about fifty per cent of the light and there is a temporary drop in the brightness of Epsilon Aurigae. Normally of about the third magnitude, this star drops to fourth magnitude when eclipsed by its dark companion. Studies of the peculiar light changes of the star have been made during a period of many years. In fact the first clue to the nature of this "eclipsing binary" star, which is the name astronomers give to such celestial bodies, was detected by the late director of the Yerkes Observatory, Dr. Edwin B. Frost, nearly forty years ago.

It is now known that the dark companion of Epsilon Aurigae is the largest star yet observed. Its diameter is equal to about twenty times the distance from the earth to the sun. The largest star known up to this time has been Antares, the bright red star of first magnitude in Scorpio, which has a diameter of about four hundred million miles. The super-giant companion of Epsilon Aurigae, however, would, if placed at the center of our own solar system, engulf all of the planets except Uranus, Neptune and Pluto, and its surface would lie one hundred million miles or so beyond Saturn's orbit.

The density of the companion of Epsilon Aurigae is so low that it may be said to be semi-transparent. Its strongly ionized outer atmosphere is similar to the Heaviside layer in our own atmosphere, in which originate auroral displays and which strongly absorbs radiations of certain

wave lengths from the sun. The radiations from the brilliant and massive sun, about which this huge mass of rarified gas revolves, produce luminous effects in the atmosphere of its companion, which also reflects the light to space. This causes the dark star to shine dimly with reflected light. This ghostly radiance has been observed in the Yerkes 40-inch telescope. Efforts are now being made to photograph the star's infra-red radiations on photographic plates sensitive to infra-red light. The temperature of the dark star is only 1000 degrees Absolute, which is the lowest ever recorded for a star, and means that it is not luminous enough to be visible to the eye. The average temperature of the coolest of all the stars—the giant red stars, such as Betelgeuse, Aldebaran and Antares, and the dwarf red stars—is between 3000 and 4000 degrees. The temperature of our own sun is 6000 degrees Absolute, and that of the brilliant component of Epsilon Aurigae, about which the dark star revolves, is 7000 degrees. It is what is known as an F-type star, several thousand times more luminous than the sun, and yellowish-white in color. Lines of ionized calcium are strong in the spectra of F-stars and in G-type stars, which include our own sun, and the brilliant yellow Capella in Auriga. Procyon is a star of the same type as the bright star in Epsilon Aurigae, but does not have the unusual characteristics that cause Epsilon Aurigae to be labeled "peculiar".

The constellation of Auriga is now in the northwestern sky, north of Orion, which will soon disappear below the western horizon. Auriga can always be readily found with the aid of its first magnitude star, the brilliant yellow Capella, which is one of the brightest stars in the sky. Only a few degrees from Capella, to the southwest of it, lies the familiar little asterism known as Haedi, or The Kids, a group of three stars of third and fourth magnitude. Epsilon Aurigae is the farthest north of the three stars in this group and the one nearest to Capella. The other two stars in the group are Eta and Zeta Aurigae. Eta is almost exactly equal in brightness to Epsilon Aurigae when the latter star is at its maximum brightness. Zeta is of the fourth magnitude and fainter than Epsilon except when Epsilon is partially eclipsed by its huge dark companion. The name Capella signifies She-Goat, and Capella, with Haedi, The Kids, is represented on the mythological star-maps as held in the arm of Auriga, The Charioteer.

The distance from the earth to Epsilon Aurigae is about 540 light years, if computed with the parallax given for this star in Schlesinger's Catalogue of Bright Stars. Light from this star, then, takes nearly five and a half centuries, travelling with a velocity of 186,000 miles per second, to reach the earth. Its distance is about equal to that of some of the brightest stars to be found in Orion.

This month one should not miss the opportunity to see Mercury at its best in the evening sky when it sets about two hours after the sun on the date of its elongation, April 2, although it should be easily visible for a week or more before and after this date. The spring is the best time of year to see this planet in the evening sky and the fall the best time to see it in the morning sky. This is due to the fact that the ecliptic, in or near which the planets will always be seen, rises most sharply from the western horizon at sunset in the spring and from the eastern horizon at sunrise in the fall, and the planet can never be seen far from the sun.

On April 2 Mercury will be about nineteen degrees above the western horizon at sunset. It should be an easy matter to find it in the evening twilight at that time for it will be as bright as a brilliant star of zero magnitude, such as Capella or Vega. It will, moreover, be in conjunction with the moon on April 2, and not far from the brilliant Venus, which is also in conjunction with the moon a few hours earlier on April 1. Mercury and Venus will also be in conjunction on April 8, and the two planets will not be a great distance apart during the first ten days in April. For this reason alone it should not be difficult to locate Mercury at this elongation.

In the telescope Mercury shows phases just as the moon does. At the time of an elongation, when the planet is farthest east or west of the sun, its phase is that of a half moon. Between superior conjunction with the sun and eastern elongation it has the phase of the gibbous moon. That is how Mercury appears in the telescope the last week in March. After elongation, on April 2, it becomes crescent in phase, the crescent narrowing rapidly as the time of inferior conjunction with the sun draws near. This occurs this month on April 21, when the planet lies between the earth and sun. It is, of course, invisible because of its nearness to the sun for some days before and after this date. Its phase at the time of inferior conjunction is the same as that of the new moon. As the planet decreases in distance from the earth after elongation, its brightness also decreases rapidly because the area of its illuminated surface is growing less. The planet will be most brilliant two weeks or so before its elongation, when it appears gibbous in the telescope and rivals Sirius in brightness, but it is then too low in the west at sunset to be seen. It will be at its best a week before and after April 2. Venus is a magnificent object low in the west this month. Mars is also visible in the west for a few hours after sunset, passing from Aries into Taurus. Jupiter is now a fine morning star, rising about two hours before the sun. Saturn is also in the morning sky but too close to the sun to be seen this month.

•

LATE SNOW STORM *By* BESS NOVACK

The universe swirled on white feathered pinions.
The Sky and Earth exchanged dominions.
And all that was gaunt and grim and rough
Was gently clothed with soft sky stuff.

ONE OF THE INVITING ROADSIDE PARKS ALONG THE TEXAS HIGHWAYS

Planted with trees, these areas, of which there are some four hundred in the State, provide the motorist with a chance to stop and rest on long Texas drives

TEXAS MAKES AN IMPRESSION

By ELIZABETH B. LAWTON

of the National Roadside Council

Mr. and Mrs. W. L. Lawton of the National Roadside Council are in California making a survey of progress in county zoning. This method of controlling roadside enterprises, billboards and other conditions in the environs of highways has been applied more widely in that State than elsewhere. This State-wide study is being carried on under the auspices of the American Nature Association. The results of this study will be published in volume one, number two, of the *American Nature Association Quarterly Bulletin*. En route to California, Mrs. Lawton crossed Texas and sends us the following interesting report. EDITOR.

We were delighted with the highways of southern Texas, and found a program of roadside development that is the most intelligent and effective we have seen in any southern State. We had, in fact, rather dreaded the long ride, and had expected that the semi-desert sections of western Texas would be something we would be glad to get through with. We were, therefore, surprised to find the scenery constantly varied, and the highways themselves to have a remarkable degree of interest and variety, due to the fine work the State has done in roadside improvement.

The wide rights-of-way, sweeping in broad curves around the natural contours of the hills and out across the plains, express the spaciousness of Texas. The gentle slopes on either side of the pavement, and the broad and shallow ditches, not only satisfy the eye but give a distinct feeling of safety. Native plants and trees have been cleverly used to break monotony and to offer a restful bit of green here and there. Single trees and small groups of trees alternate on the roadsides and will be increasingly effective as they grow.

These borders are a telling demonstration of effective planting at low cost. Most of the trees have come from nearby fields and were set out by maintenance crews at practically no cost to the State. In the eastern part of Texas, native pines, oaks, sumacs, dogwoods, magnolias and wild plums are found along the highways. Elderberries and Texas plumes have been widely used in the central sections, while on desert roads in the western part yuccas are most in evidence.

Every official road marker is framed by a shrub planted behind it. Every culvert is relieved by a few trees or shrubs. Where possible, large trees have been saved along the right-of-way, and all poles have been set back to the property lines. The occasional historic shrines are appropriately planted and marked. Frequently roadside parks, of which there are now four hundred in Texas, invite the traveler to pull off the road and rest. The land for these is usually donated, and 15,000 trees and 50,000 shrubs were planted in them last year.

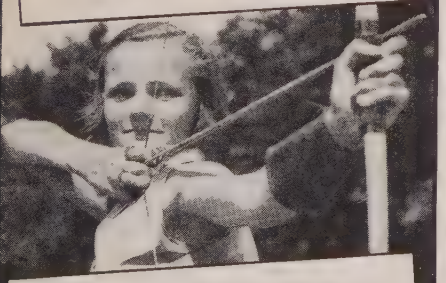
We discovered that if we could return in the spring we would find the roadsides blooming with wild flowers. Each fall, maintenance crews gather wild flower seeds from nearby fields. Eighty tons of such seeds have been sown along the highways, including verbena, bluebonnet, phlox, blue salvia and other plants.

A motor trip across Texas leaves one with the utmost respect for the engineers who have provided the good roads, and for the men of the landscape division, who, headed by Jac Gubbels, have done so much to improve the roadsides and to provide safety and pleasure for the traveler. Texas will, we are sure, reap the benefit that accrues from a policy that recognizes that a State's roadsides are one of its best advertisements. While the values of beauty in the rural countryside are intangible, attractive highway environment is gradually being appreciated as a silent but effective invitation to return.

NEW ENGLAND offers your child these BIG CAMP VALUES

1. NATURE STUDY. New England's mountains, lakes and seashore provide your child with rich natural surroundings for field work and exploration.

2. CHARACTER BUILDING. Days at camp, under supervision of intelligent counselors, will develop traits of untold value to your child's future happiness.



3. FUN. Happy outdoor play, archery, swimming, boating, hiking, overnight camping. Good food and New England's cool, sunshiny climate will help make your boy or girl strong and healthy.

FREE Illustrated booklet. Filled with facts about selected New England boys' and girls' camps.

NEW ENGLAND COUNCIL U-18
Statler Building, *Boston, Mass.*

*Name*_____

*Address*_____

WHEN NATURE SINGS A LOVE SONG

(Continued from page 216)

penguins in their nest construction, even dull human beings can easily see what he has on his mind.

Although many of the wild folk are "Don Juans", some follow the course of true love and remain loyal to their mates during their whole life. Permanent mating seems to be especially the rule with birds and animals where the sexes look much alike, such as geese, swans, wolves and beavers.

The coyote, too, is noted for his constancy, for these folk, in spite of their reputation for rascality, show a deep and lasting affection for each other. Theirs is a romance such as that of Robin Hood and Maid Marian, since they, too, are outlaws in the eyes of the world. It would seem that all hands are turned against them, yet they bravely live and love, standing steadfastly together for better or for worse, even in the face of death. Thus they raise their families, instilling in them the true coyote traditions, so that they, too, may carry on the course of true love.

"I love you truly" is more than a song to the Canada geese, for they, also, are steadfast and devoted when once mated. Geese usually pair for life and they make faithful couples indeed, sharing all domestic responsibilities and building family ties both strong and true. Although the ganders sometimes have difficulty in making up their minds about their life mates and may court different ladies, once they settle down they live happily ever after. Even after death the surviving mate may long remain true, although there are cases of geese taking a second mate.

Although some of their neighbors may do as Solomon of old did and take unto themselves a harem, the raccoons are strong adherents to monogamy. When their wedding bells chime, they promise to love, honor and obey until death parts them. Even death has a difficult time in separating them, for both may go down fighting against great odds.

The wolf's affection and chivalry to his mate are noble qualities, unquestioned even by his worst enemies. He remains loyal and true throughout the life-long union. There are countless tales of this devotion, a devotion that has brought death to the surviving mate who through grief followed his mate into the hunter's hands. His chivalry to his mate is of a high order, for there are many instances of his kindliness and restraint when provoked by the female wolf. He is a good father and assists in rearing and protecting the young. This alone indicates, in the animal world, that he is also a constant husband. When the young arrive, he never intrudes upon the privacy of the mother and babies, but is always near, to provide protection and food when either is needed.

It would seem that the path of love in Nature is untrammeled but, as in the case of human beings, vice sometimes rears its ugly head. There is at times more contamination among animals than is generally known. Infidelity is common in some species. Occasionally there are unusual matings between species that are far apart. Vice, however, is usually believed to be more prevalent among domestic and captive animals than in the wild. Whether this evil is an outgrowth of captivity or whether this mode of life has offered unusual opportunities is still a great question among naturalists.

This miniature takes snapshots wherever you are...

OUT FOR THE EVENING . . .

Theatres, restaurants, night clubs, at boxing and wrestling matches, at the circus . . .

AN EVENING AT HOME . . .

Under Photofloods, in the nursery, at the card table, during parties . . .

OUTDOORS THIS SPRING . . .

Lightning-fast action shots—a hunter clearing the bars, birds on the wing, a yacht with rail under . . .

WHEN YOU TRAVEL . . .

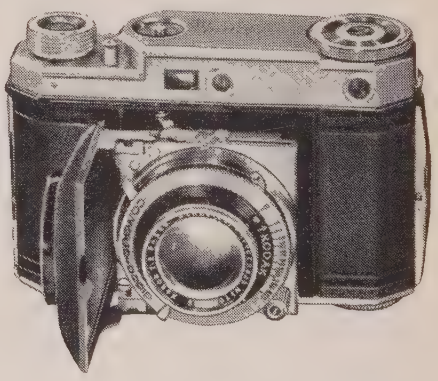
Snapshots not only outdoors, but inside cathedrals, museums, galleries . . .

AND IN FULL COLOR . . .

Gorgeous full-color transparencies of most of these subjects simply by loading with Kodachrome Film . . .

. . .

All of this in addition, of course, to quality-plus pictures on ordinary occasions.



KODAK RETINA II

Coupled range finder, body shutter release, double-exposure prevention device. Lens, superb anastigmat *f*.2.0 or *f*.2.8. Shutter, 1/500 Compur-Rapid. Kodak Retina II, *f*.2.0, $140; Kodak Retina II, *f*.2.8, $115. Prices include sportsman's field case. KODAK RETINA I, famous original Retina with Kodak Anastigmat EKTAR *f*.3.5 lens, at $57.50.

Both Kodak Retinas load with a wide range of Kodak Film to meet every picture-taking need.

See Kodak Retina at your dealer's... Eastman Kodak Co., Rochester, N.Y.

ONLY EASTMAN MAKES THE KODAK

THE SCHOOL PAGE ★★★

EDITED BY DR. E. LAURENCE PALMER
Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

WHAT'S NEXT?

There is no better time of year to ask the question "What's next?" than the spring. Coupled with this question as to the future might well be another, "How come?", which implies some knowledge of the past. An excellent series of Nature study experiences might center about these inquiries. While any series of local observations made in answer to these two questions should provide a rich program, teachers seem to need more specific suggestions. Some comments on this page indicate that its offerings are too rich; that too much illustrative material is given; that one example to illustrate a given point would be better.

In keeping with this suggestion the page this month limits its suggestions for magazine references to the 1938 numbers of NATURE MAGAZINE so far published. Those interested in further references may find them in abundance in *Nature Magazine's Guide to Science Teaching* or by searching independently in volumes 28, 29 and 30 of the magazine. Grade placement suggestions through the first ten years of school, as they apply to the topic now under consideration, appear on page 13 of the 128-page *Guide*, which is now available for twenty-five cents.

An appropriate article for the study of life cycles is that by Ellsworth Jaeger on page 215 of this issue. When Nature sings love songs many things happen that may be observed this month. The author suggests song, perfume and dancing, giving an abundance of illustrations. He fails to suggest the habit of an individual to feed its partner, whether the rooster digging worms for the hen in the garden, or the girl friend getting a free drink at the soda fountain. This next month watch for any two living things either singing to or at each other, dancing in the presence of each other, feeding each other or exhibiting excessively strong scent.

For suggestions regarding cooperation of parents in the selection of a home see page 140 of this volume of NATURE MAGAZINE. Look through all numbers available for pictures showing stages in life cycles, whether eggs, larval or young stages, mature individuals of each sex, or old individuals. Then decide where, in these life cycles, the individuals shown on the following pages belong—pages 8, 14, 15, 22, 38, 47, 57, 72, 75, 77, 94-97, 104, 148, 159, 162, 163—and, in this April issue, any of the animals shown in the rotogravure section. Ask the pupils to go through the suggested pages and indicate which creatures shown are young, old or middle-aged, in their judgment. The long list of pages is given merely to save the trouble of making such a list independently.

In studying the cycles through which living things pass, check on the points raised in the article, also by Jaeger on pages 35 to 37 of this volume. Then look for examples locally, seeking young that, when born, are rather independent, and others that are at first helpless. Look through local ponds for living examples of the bullfrog, shown transforming in the rotogravure section of this number. Notice whether in all local species the same sequence of appearance of organs takes place, and if the ears are always the last to appear fully developed? Do not get the impression that because the transformed animal has taken the shape of a mature frog that it is sexually mature, because it probably is not. It may, in some cases, still take a number of years before this development has been completed.

It is well to call attention to the fact that the pictures of the bullfrog in this number show splendidly the web fully developed to the tip of the toes on the hind foot, and also show the pronounced wrinkle down the side behind the ear. In the green frog, which is sometimes mistaken for the bullfrog, the webbing is not as shown and the wrinkle runs down the back instead of down the sides. In the Northern states the bullfrog spends its first two winters in the tadpole stage.

Some interesting literature dealing with the rearing of frogs for profit may be had from most firms advertising in this field. Much of what these advertisements say cannot be true, and much is obviously designed to mislead. One in defending its frogs against being nuisances to the neighbors says that they make no more noise than a dog or cat. It also says that the percentage of hatching of the eggs may be higher than with poultry. No one can contradict these statements but they are obviously misleading. Write to some of these firms for their literature and point out the fallacies involved.

Any study of the cycles through which living things go should include a survey of the types of homes involved. Some of these are shown in this volume on pages 14, 15, 35, 38, 40, 74, 75, 76, 77, 94, 140, 149, 150, 152, and in the rotogravure section of this number. Which of these homes show evidence of modification by the occupants? Which are elaborately made and which are crude? In which are the materials modified by the builder, and in which does there seem to be selection of particular materials for a base, others for providing a frame and still others for a lining? Which, if any, provide protection from the sun or from rain from above? In which is it essential that such protection be supplied by the builder's own body? What evidence is there in the pictures that such protection is given? Is there any evidence of the practice, or lack of practice, of sanitation in the home?

The article in this number called "Wild Brother's Temperance" gives some good instances of habits possessed by many living things. It may have some statements that will draw criticism from other writers, but it calls attention to the routine that becomes so habitual in the lives of many living things. Make notes of what happens on a given day in a given place in any half-hour. If similar weather conditions exist the next day, is there much variation in the kinds of things found active and in what they are doing? Make observations at different times of day to see if the same things happen at all hours through the day. Then follow this procedure, by reference to notes made earlier in the year or in other years, to see whether the same things happen at all these times. One of the most remarkable of Nature routines is associated with the migration of birds to the North in spring. Certain species arrive at a given place on or about a given date year after year. There is, for example, little variation through the years of the first date of arrival of such birds as the orioles, house wrens, chimney swifts and so on. How little and how great is this variation really? The fall migration may not be so regularly timed.

Wake up early some morning in the spring and keep a record, as far as possible, of the order in which kinds of birds first begin calling. Next morning make a similar list and repeat this for a few days. Is the same sequence preserved through the days? If you do not know the calls of the birds, an excellent new Victor record of actual bird calls recorded by Brand and Kellogg is on sale this spring. This should aid in learning bird calls and help one to name many kinds of birds through their calls. This record is not made of imitations of bird calls but of the actual calls of the birds themselves. It should be in every school pretending to teach children about birds.

Suggestions as to the changes that take place in the wearing away of hills and the building up of deltas, mountains and the like, may arise from studying the pictures of land forms on pages 17, 18, 19, 29, 30, 83, 84, 85, 86, 93, 98, 100, *108*, 143, 145, 146, and in the pictures of the National Parks in the rotogravure section of this number. In these pictures will be found examples of land being built up or torn down by water, wind, or frost. Which of the National Parks shown might have been built by methods shown in the other pictures? Which might have been made by wind-blown sand; by water-deposited sediments, or otherwise? We can speak correctly of new and of old valleys, the latter usually being more open and with more rounded sides. Which of the valleys shown are of each of these types?

If you are not inclined to outdoor Nature study, and still wish to study changes dealing with Nature, read carefully the article in this number about the work of Rex Brasher in depicting birds. Compare the examples here given with pictures of the same species by Fuertes, Horsfall, Sawyer, Sutton, Brooks, Poole, Jaques, Weber, or other modern bird artists. Is it your judgment that Brasher's representations surpass in accuracy those of Audubon, or approach in accuracy or artistic qualities the work of the more modern artists? For example, what do you think of the representation of the shadows, of the position of the feet of the alighting bird and of the detail shown in the picture of the common tern? Study of these pictures may induce you to wish to find for yourself which artist most accurately portrays the subject. You may be induced to get out of your armchair and into the open to see what is there. In comparing the work of artists of Nature subjects, from Wilson and Audubon to the present, it will be noticed that in the more recent work there is less tendency to "map" the subject and a greater tendency to portray the personality of the subject without sacrificing detail. Of course it is not proper to map in detail the scales on the leg of a bird whose legs, by all laws of picture-making, should be in deep shade.

(Continued on page 252)

The
New York State College
of Forestry

SYRACUSE, N. Y.

Undergraduate courses of four years are offered in forestry leading to the degree of Bachelor of Science. There is also opportunity for graduate work in several branches of forestry leading to advanced degrees.

The College has ample laboratories and classrooms in William L. Bray Hall and the Louis Marshall Memorial Building. It has forest properties approximating 20,000 acres that serve for demonstration, research and instruction in forestry.

Special laboratories for instruction in wood technology, in pulp and paper making, in kiln-drying and timber-treating and a portable sawmill are other features of this institution.

Applications for admission must be filled out and returned before June 15.

Catalog mailed on request.

SAMUEL N. SPRING, *Dean*

ROCKY MT. TEACHERS AGENCY
410 U.S. NAT. BANK BLDG. DENVER, COLO.
Est. 1906

GOOD TEACHERS IN DEMAND

Rural to College Inclusive. Special Territory West of Miss. Copyright Booklet "How To Apply, etc." free to members, 25c to non-members. Unexcelled Service. Largest in the West. **Wm. Ruffer, Ph.D., Mgr.**

— CAMPS —

KAATERSKILL
Pownal, Vermont. Christian Boys 5-19
(Four age groups)

40 miles from Albany. Varied program of activity. Trips. Riding. Trained staff. Physician. Complete equipment, $18.50 a week. 17th Season. Catalog. **Herbert B. Lorenz, Director, P. O. Box 424, Bennington, Vermont.** *Affiliated with Camp Woodland, Londonderry, Vt., for girls.*

Kindergarten camp for little tots under the camp age.

ROUND-UP LODGE
For Boys, 8-18 **Buena Vista, Colorado.**
An unusual vacation in the Colorado Rockies, offering a recreational and educational program of real western life. A horse for each boy. Pack trips. Perfect swimming. Auto trip to the Indian Reservations of New Mexico. 12th Season. All-Inclusive Fee. Catalogue: **Dr. E. A. Marquard, 4502 Olive St., St. Louis, Mo.**

Summer Nature Camp

Ideally situated in the picturesque mountains of central Pennsylvania, this camp offers Nature Study in a fascinating environment under eminently qualified leadership. New buildings and additional equipment make living and studying in the open a new pleasure. Established 1923.

First Session—June 23 to July 14
Second Session—July 13 to August 3

The Nature Camp is a part of the regular Summer Sessions. Graduate and undergraduate credit.

Illustrated booklet on request

Prof. George R. Green
Director of the Nature Camp
THE PENNSYLVANIA STATE COLLEGE
State College, Pennsylvania

"I'LL PAINT THEM—EVERY ONE"

(Continued from page 204)

But by the simple process of arithmetic he computed that he could not possibly live long enough to paint that many plates by hand. So he reduced the number from five hundred to one hundred and set about it. He has just recently completed the stupendous task of hand-painting 90,000 gravure plates. Priced originally at $2400 for the set of twelve volumes, the few remaining sets have risen in value from $4200 to $10,000.

One of these rare editions, fortunately, is in the Rare Book Collection of the Library of Congress. Others are owned by private individuals, nationally known men and women who treasure their volumes immeasurably, and still others are owned by scientific institutions, schools or colleges.

Today, in the same little farmhouse in Connecticut where he completed his paintings, Rex Brasher finds himself somewhat bewildered by all this excitement his birds are creating. When a man labors for half a century, unobserved and unsung, on a labor of love, public acclaim is very apt to confuse or frighten him. So it is with Brasher. He seldom leaves Chickadee Valley for the cities, and when he does, he hurries back to his hills and valleys as eagerly as one of his own chickadees or song sparrows—his favorite birds.

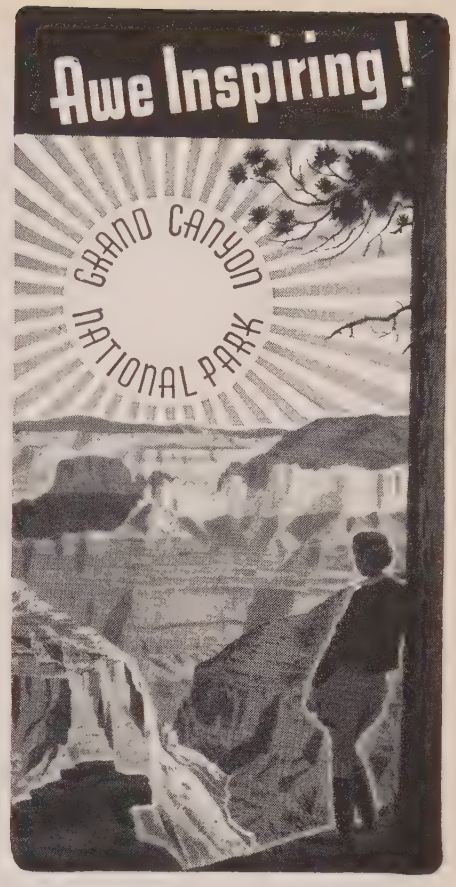
"Birds," declares Rex Brasher, "I have always envied. Long ago, when I tried to catch a song sparrow, well do I remember my amazement that it escaped into the air. As years brought better acquaintance, admiration for their beauty and courage was added to astonishment. Time has strengthened both feelings. The song sparrow's cheery tinkle, the veery's song of long ago, the thrasher's hymn to the dawn, and the merry chickadee outside my window, have the same allure as always. Many a night I have drifted into dreamland on the wings of shore birds fleeting against gray skies, or remembering the slow looping of a redtail against the blue."

Rex Brasher believes that the most attractive trait of birds is the spirit in which they take life.

"Beset on all sides by lethal arrows," he says, "they know more keenly than any others that death is the rule, life the exception. It does not matter. They are gallant children, living the few swift hours of life with courage rarely attained by mortals."

Delightful Essays

Many of our readers will no doubt recall several delightful Nature essays contributed to our pages by E. Chesley Allen. All reflected a knowledge of and a sensitiveness to the outdoors, and these attributes were combined with a charming literary style. Now comes from The Ryerson Press, Toronto, a little book bearing the title *Our Northern Year*. It is a collection of his outdoor essays, with here and there a Nature poem. Some essays included in the volume appeared in our pages; others first appeared in the pages of various Canadian publications. Reproduction of a number of illustrations by R. Bruce Horsfall gives added charm to the book. Any Nature lover who knows and loves the northeastern country will find this book eminently worth the modest $1.25 asked for it.



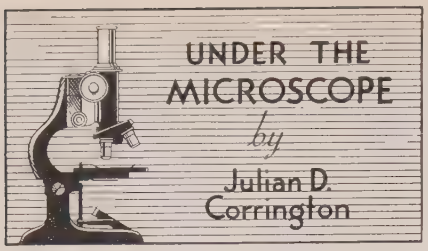
GRAND CANYON . . . world's most dramatic scenic masterpiece . . . a gripping, overpowering display. This immense chasm, thirteen miles wide and a mile deep, is but one feature of a thrilling low-cost, 6-day tour from Lund, Utah, which also includes the great rock temples of Zion . . . the flaming colors and fantastic formations of Bryce . . . and many other scenic highlights.

Travel on fast, air-conditioned Union Pacific trains direct to Lund, Utah, the rail gateway to these famous Arizona-Southern Utah National Parks.

THE PROGRESSIVE
UNION PACIFIC
Road of the Streamliners and the Challengers
UNION PACIFIC THE OVERLAND ROUTE

W. S. Basinger, P. T. M.
Room 603, Union Pacific Railroad
Omaha, Neb.

Please send me information about Zion-Bryce-Grand Canyon National Parks.
I am also interested in. _____
Name _____
Street _____
City and State _____
☐ Also send "Summer Tours to Western Wonderlands"



How Microscopes Magnify

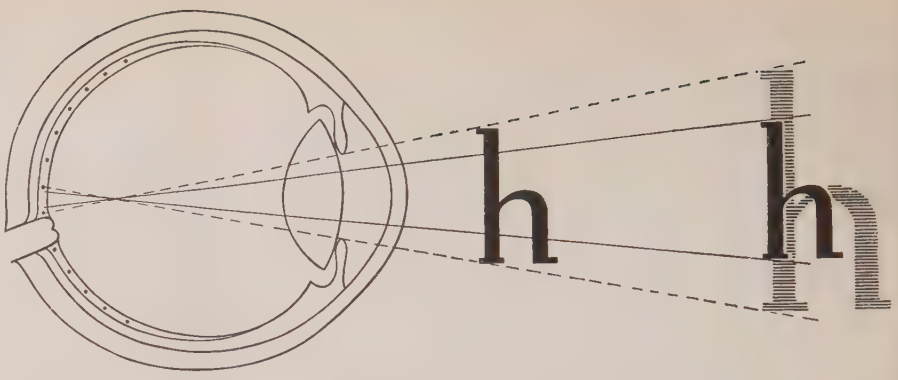
The average user of a microscope takes magnification for granted, giving little or no thought to why it is that bits of curved glass give an enlarged image. All of us at times tend to regard this property as something vaguely profound or even akin to the magical. While wonderful, there is nothing magical or intrinsically difficult about magnification. The best approach to its principles is through a few simple experiments.

First select for examination an object that has quite a bit of detail. A stained microscope slide of some organ, a specimen of fine print, a newspaper halftone illustration, a lantern slide, or developed photographic negative plate will serve. Hold this before the eyes and study it closely, moving it closer and then farther away to determine that there is a range within which detail can be seen clearly. This may be between thirty inches and six, with ten inches giving the most acute image, varying according to different visions.

Inside the six-inch limit the image blurs. The human eye, with its flexible lens, is an adaptable optical instrument, but it has its limits.

Now cut out a 3-x-5-inch card from black photomount or cardboard and in the upper center puncture a fine hole with a small needle. A white card will do, although a black is better. Hold this card in front of and close to one eye to look through the hole, and be sure that the object is strongly illuminated. Stand with the back to a window so that light falls on the object, or hold it beneath a lamp; if transparent, hold it against a strong light. Observe this object through the pinhole at a distance of some six inches, then gradually bring it closer.

It will be discovered that you can get the eye to within two inches or less and still see a distinct image. The area observed will be smaller, but what is seen apparently will be larger than normal, i.e., magnified, just as if through a weak lens. The halftone screen of a newspaper photograph is easily discerned; indeed, with care and good lighting, it is even possible to make out the much finer screen of a magazine halftone. *Magnification consists in getting the eye exceedingly close to the object!*



To explain this drawing, let us assume that the sensitive parts of the eye are widely separated as symbolized by the dots in the drawing. It can be understood, then, that rays of light from the extremities of a small object would not register. But if the angle of the rays is made greater, either by enlarging the object or moving it nearer, these rays will then contact two sensitive cells and be registered. In the drawing, of course, the focal point has been constricted to keep the drawing within reasonable size.

Size is relative. We are accustomed to viewing objects at distances ranging from ten inches to many miles, and what our brain records as to size depends on distance, memory and association with familiar surroundings. Look at a crowd of people from the observation tower of a lofty building; we see them far below us, foreshortened and from an unfamiliar angle, and we say they "look like ants." Travelers at sea or in desert country are continually fooled by sizes and distances.

The pinhole card shuts out all but a few rays of light and permits focusing at close range without blurring, but it, too, has its limits. The next step is to employ a lens in aiding the eye to get still closer to the work. In optical terminology, the apparent size of an object depends on the *visual angle*, for explanation of which a second experiment should now be performed.

Set up a yardstick in horizontal position and look at it from a distance, as across the yard or street. The entire length of the stick is seen clearly and simultaneously, as a single object. Imagine two strings, one from each end of the stick, converging to meet at your eye; these will form an angle at the eye and this is the visual angle of this particular example. For that matter, the strings can actually be set up and the angle measured without difficulty.

Now walk toward the yardstick. Somewhere around twelve or fifteen feet from it the eye will tend to focus on the center of the stick. The two ends will still be seen, but blurred. When close up, as at a distance of one foot, the entire stick can no longer be seen—the visual angle has become too great.

Reverse the process and walk away from the yardstick. There comes a point where it can no longer be observed at all. We say that it is "too small to see." Just what do we mean? Is it a question of insufficient light? We might imagine illuminating our object by running a neon tube from one end to the other, and we could see this light at a greater distance than the unlighted stick. But of course there comes a point from which even the brightly glowing stick could no longer be spotted.

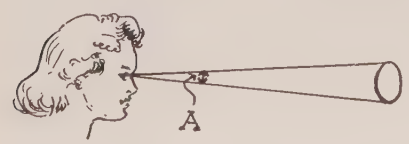
As early as 1674, Robert Hooke, English microscopist with whom we shall deal later in our Historical Outline, was concerned with this subject and concluded that if double stars were to be recorded by the human eye as two separate stars and not as a single large one, then the visual angle must be at least as great as one minute. People vary in this capacity, but the statement holds true for the average eyesight. Any given circumference is divided into 360 degrees and each degree into 60 minutes; hence one minute is but one 21,600th part of a circle.

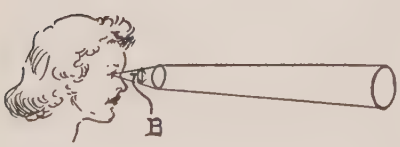
The measurement of this tiny arc has been calculated for certain definite distances. For example, if an object lies one meter from the eye, then its two ends must be not less than 0.29 millimeters apart to be seen as two distinct ends and not as a single point.

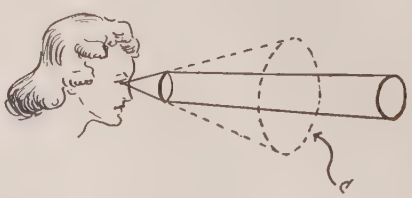
Today we have an anatomical explanation for Hooke's observation. The retina of the eye is made up of sensitive cells, the rods and cones, arranged side by side like pickets in a fence. It is believed that if rays of light fall entirely upon a single one of these light-perceiving cells, the object viewed will appear merely as a point, whereas if these rays affect two or more cells simultaneously, then the object has breadth.

At a distance of one mile a yardstick still has sufficient breadth so that light rays coming to our eye from its two extremities will fall upon at least two of the retinal cells and hence the object will be seen as a stick, possessing breadth. The arc subtended by a yardstick at one mile is still greater than one minute of a circumference whose radius is one mile; the visual angle is greater than one minute. At two miles, however, this is no longer true, and even a strongly illuminated

Effects of use of a lens. In the first sketch, *A* indicates a narrow angle in viewing a distant object with the unaided eye. In sketch two, *B* shows a greatly increased visual angle owing to the way in which a lens bends the light rays in to converge on the eye. In the third sketch, these bent rays have been projected outward (dotted lines) to show how the image of the object appears much larger and closer than is actually the case (dotted image). This is magnification.







Your Child will find new interests, new health at the Top of the Poconos

Consider these outstanding advantages — for your child, for yourself—of a vacation at Pocono Manor! Here, at the top of the unspoiled Pocono Mountains, is the perfect setting for joyous good times and healthful fun for all the family.

1. 3,000-acre woodland estate, with hundreds of species of birds, wild flowers, plants and trees.
2. Children's playground, playhouse, splash pool, camp. Expert supervision relieves parents of daytime responsibility.
3. Supervised courses in nature study, Indian lore.
4. All healthful outdoor sports, safely enjoyed.
5. Pocono Manor School of progressive education. Also classes in outdoor sketching and painting.
6. Modern, fireproofed Inn; entertainment and social program. Chamber music; dance orchestra.
7. Good roads for touring; accessible to all Eastern cities by main concrete highways; 100 miles from Philadelphia and New York.
8. Physician with daily office hours, registered nurse in residence; Post Office; Western Union; drug store; gift shop.

Write today for full information and rates, mentioning NATURE MAGAZINE and ages of children. Special folder. Herman V. Yeager, General Manager.

POCONO MANOR INN

Pocono Manor—Pennsylvania

N. Y. OFFICE: 522 Fifth Avenue
VAn. 3-7200

CANADIAN LANDS Seized and Sold for Taxes

$27 buys small island
$67 buys 50 acres, travelled road
$108 buys 20 acres lake front
$171 buys half mile river front
$256 buys 87 acres lake front

Our 21st Annual List, just issued in the form of a 20-page booklet, describes the above and many other choice properties offered at Tax Sale prices. The amount quoted is the full price asked, perfect title, no mortgage. Beautifully situated hunting and fishing camps where there is real sport; summer cottage sites; heavily wooded acreages. Now is the time to invest in Canada's minerals, forests and farms. Small monthly payments if desired. Don't delay. WRITE TODAY for FREE BOOKLET with full explanation.

TAX SALE SERVICE ROOM 615, 72 Queen St. W., TORONTO, CANADA

GORGEOUS Butterflies AND MOTHS

Thousands have found in entomology a fascinating personal hobby. Collect insects and study nature in her gayest mood. SPECIAL INTRODUCTORY OFFER: 15 named uncommon North American butterflies and moths, and 30-page booklet, "How to Collect and Preserve Insects," $1.00 postpaid.

Free CATALOG

Listing of spectacular and unusual insects collected from the extremities of the earth. Also catalog of entomological supplies and collecting equipment. Write today.

WARD'S NATURAL SCIENCE ESTABLISHMENT, INC.

DEPT. E-1, P. O. BOX 24, BEECHWOOD STATION, ROCHESTER, N. Y.

THE FRANK A. WARD FOUNDATION OF NATURAL SCIENCE OF THE UNIVERSITY OF ROCHESTER

yardstick would appear merely as a point of light. All semblance to a stick would be lost.

The power of the eye to distinguish two separate objects as two is termed its resolving power, or *resolution*. In the above instance, the eye can resolve the two extremities of a yardstick at one mile, but not at two miles.

We are now in a position to understand just what is accomplished for human vision by lenses. Put a telescope to the eye, and at a distance of *five* miles the yardstick may be resolved. How is this done? In last month's

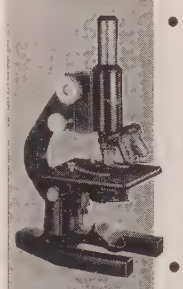
Two views of a baby seahorse seen (above) with it held close to the eye to make the details "large", consequently blurring them, and (below) through a pin hole close to the eye making details distinct.

issue we described for you the laws of refraction of light by curved glass surfaces, and if you digested that article you will recall sufficient of that information to now understand that the convex lens of the telescope receives light rays coming from the yardstick and bends them in sharply to a focus, changing their direction. They converge and form a much wider angle than would the nearly parallel rays from the yardstick seen by the eye without a telescope lens. The visual angle is artificially increased so that even at five miles the arc subtended by the yardstick is greater than one minute. Hence the stick is

BAUSCH & LOMB

A NAME THAT MEANS SCIENTIFIC PRECISION

- In the great research laboratories, universities and hospitals of the world, the name BAUSCH & LOMB is known and respected. Scientific instruments from this great house are among the most important and precise tools of science.
- Precision, too, is an essential in amateur microscope equipment Be sure *your* microscope says "BAUSCH & LOMB."
- At left, top, Bausch & Lomb New Gem, a *precision* amateur microscope, 75 to 172 power, $14.50. Center, Model H, at $135, is one of the complete B&L line of laboratory and research microscopes, $38 to $774.50. Bottom, "Adventures with the Microscope," 455-page book by Prof. Julian D. Corrington, $5.00; free with Bausch & Lomb Model R microscope at $21.
- *Write for interesting free literature*



BAUSCH & LOMB

250 BAUSCH ST., ROCHESTER, N. Y.

POCKET PRISM NATURE GLASSES

New and Used Field-glasses, Telescopes, Microscopes; all Makes, types and sizes, to fit all pocketbooks. Glasses exchanged: repair work guaranteed. Catalogue free.

J. Alden Loring Box K-2 OWEGO, N.Y.

NATURE'S hidden miracles clearly revealed through this Wollensak microscope—*only microscope with 425 power for $20.* Magnifies from 100 to 425 diameters, in steps of 25. Easy to use. Ideal for photomicrography. Also 150-power at $14.50—magnifies from 70X to 150X. At stores or direct, postpaid (or C.O.D.). *Money-back guarantee.* Send for FREE Book.

Wollensak Optical Co., 839 Hudson Avenue, Rochester, N.Y.

WOLLENSAK

made to appear much larger and much nearer than is actually the case. *Magnification takes place by increasing the visual angle so that the eye is apparently brought closer to the object.*

Microscopes operate in the same manner as in the foregoing example of a telescope, but are arranged to focus at very short distances. A lens is placed very close to the object—much closer than would be possible for the eye alone, which could not focus at so small a distance. A convex lens bends the light rays in, converging them to a focus at a point less than an inch away, thus greatly increasing the visual angle and hence the apparent extent of the arc subtended. We thus see only a small area of the object examined, but we see that area at apparently very close range and still in focus. We obtain a bug's-eye view of the object, so to speak, and our eye can resolve two fine lines, for example two parallel cell walls, and see them distinctly as two, and not as just one blurred point.

At a later date we shall return to this topic of optics, and describe the formation of images. In our Historical Outline we will shortly arrive at that era when microscopists found out how to correct defects in images by combining lenses of different shapes and composition. And so our story of lenses will be gradually completed. Suffice it for the present to conclude with a pointer on the buying of a microscope.

The uninitiated rely chiefly on statements about magnifying *power* in considering different instruments offered for sale. They think, naturally enough, that the higher the power, the better the microscope—that a machine advertised as giving 500X is necessarily better than one yielding a mere 250X. Aside from the fact that low powers are more useful for most of our studies than high powers, mere magnification alone is not enough. Any curved piece of glass will magnify, and the cheap "microscope" that advertises high power is probably correct as far as the statement goes. But it takes a precision-ground lens of the best quality of glass, and corrected for defects, to produce good resolution, and this is the factor to consider in buying a microscope. Magnification without resolution is termed *empty magnification,* and is worthless. You cannot make a silk purse out of a sow's ear, nor can you buy a microscope worthy of the name for one dollar. The blurred image produced by cheap lenses is worse than useless and discourages the beginner since he cannot achieve the promised results.

Historical Outline

The next personality to claim our attention comes hard on the heels of Galileo. The great German astronomer, physicist and mathematician, Johannes Kepler (1571-1630), author of Kepler's Laws concerning the motion of planets and discoverer of many important principles in his various fields, made modern types of microscopes on paper and initiated methods still in use in designing lenses by theoretical optics. Modern as here used refers to lens systems and not to mechanical parts, since the reader would find it difficult to recognize instruments of this era as being microscopes at all. Kepler knew the laws of refraction and the role of the eye in vision, and so could write mathematical formulas to govern the construction of lenses in both microscopes and telescopes.

There is no evidence that he ever built any such instruments himself, leaving the actual work to others. But his *Dioptrice,* published in Cologne in 1611, includes the first lens formulas and the first explanation of the action of the eye in forming an inverted image, as well as first descriptions of how spectacles correct defects of vision.

Kepler's microscope consisted of two convex lenses and produced an inverted image, as in the case of modern instruments. Considerable confusion in naming microscope types has resulted from differences of opinion as to the lenses used by Jansen. According to an older view Jansen's microscope, like Galileo's, employed a convex objective and a concave eyepiece and gave an erect (i.e., not turned upside down) image. Hence this type came to be known as the Dutch or Jansenian microscope, and the modern one as the Keplerian.

The more recent view is that Jansen used two convex lenses and that his system was essentially the one of Kepler and of present-day microscopes. Jansenian and Keplerian types are then the same, and the "Dutch" instrument should be designated as the Galilean.

Fundamentally, the microscope used today by readers of these columns is that of Jansen and Kepler, but an enormous number of additions and improvements have been gradually incorporated and it will be worth while to trace the history of the more significant of these.

Galileo was the first to mount his lenses in such a way that they could be moved back and forth for focusing, and if extant drawings of his instruments are reliable, this was accomplished by screw threads, as in the modern tripod (simple) microscope, widely used for low power dissecting work in schools.

Trade Notes

If you are interested in making histological slides of vertebrate animals, you will need some form of guide to the anatomy of these animals. Just off the press is a new (third) edition of a well-known work, *Vertebrate Zoology,* by Professor H. S. Pratt. This volume of 362 pages contains complete directions for dissection and study of amphioxus, lamprey, dogfish, shark, perch, necturus, frog, turtle, pigeon, cat and rabbit. Ginn and Co., 70 Fifth Ave., New York City. $2.20.

* * *

Among the great manufacturers of optical equipment is W. Watson & Sons, Ltd., London, this year celebrating their centenary. We plan to tell you about them and their hundred years of progress and service in a later issue, but wish at this time to call attention to one of their publications, issued quarterly, the *Microscope Record.* Though containing a certain amount of advertising, this house organ is made up mainly of articles on microscopy by amateur and professional alike.

No. 42, September, 1937, includes such subjects as collecting material for the microscope, rare diatoms, how to study iron and steel specimens, culturing invertebrates, displaying nerve preparations, and making transparent mounts without dehydration. No. 43, January, 1938, just received, has preparation of rock sections, more rare diatoms, microscope thrills, the concave mirror, enlarging apparatus for drawings, and other items.

Watson has kindly consented to place at the disposal of readers of this Department twenty copies of each issue for free distribution, and we now have ready twenty of each of the above two numbers. To the first forty requests received we will mail one of these magazines, postage free. Specify the number you wish (42 or 43) and this will be sent if still on hand; otherwise the other one. Only one copy to a person; first come first served.

* * *

Those whose chief joy in the microscope lies in photomicrography will be glad to learn of the existence of a society with which they might care to affiliate. This is the Biological Photographic Association; Secretary, Miss Anne Shiras, Magee Hospital, University of Pittsburgh, Pittsburgh, Pa. As the title indicates, all forms of biological photography, methods and equipment are embraced, so that while photomicrography is by no means the sole work of members, it forms a very considerable part. Write to Miss Shiras for further information if you are interested.

* * *

Can you use slides and covers in quantity? If so, you can save money by purchasing in original package lots. One of the finest grades on the market is the *Gold Seal* brand, in many sizes and thicknesses, uniformly brilliant in clarity, and guaranteed against imperfections, corrosion or fogging. For details and prices write to the Clay-Adams Co., Inc., 25 East 26th St., New York City.

* * *

Under the Microscope is a department of NATURE MAGAZINE designed for those readers interested in microscopy and maintains a service to render assistance with problems in this field. You are invited to take advantage of this service. Address all inquiries to Julian D. Corrington, NATURE MAGAZINE, 1214 Sixteenth St., N. W., Washington, D. C.

Sincerely,
JULIAN D. CORRINGTON.

Sanctuaries Here and There

In a book entitled *Wardens of the Wild,* T. C. Bridges has assembled information on sanctuaries for wildlife ranging from the great Kruger Park in Africa to the songbird sanctuary of Charles E. Jones near the city of Vancouver, British Columbia. Pointing to the increasing realization of the importance of wild birds and mammals for themselves instead of as something to shoot at, the author describes the creation and administration of these sanctuaries in terms of hope for the future. In connection with these he points to the sad record of destruction that has finally aroused public opinion. It is unfortunate, of course, that Mr. Bridges could not personally have visited the areas about which he writes. He was forced to rely upon reports and correspondence, which are not usually the best means of getting unprejudiced facts. However, the author appears to have weighed his information carefully in producing a readable book with many valuable data. The volume is published in this country by Dodd, Mead and Company and sells for $2.50.

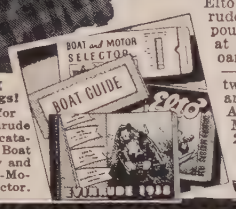
Thrilling NEW
EVINRUDE "Ranger"
ONLY $47.50

A brand new Evinrude . . . amazingly light, handy and powerful. Weighs only 16 lbs., and cruises 3 hours on a single fill! Literally *packed* with big-value features including famed Hooded Power — Evinrude Co-Pilot — Underwater Silencing. Starts *instantly!* — spins into action with a flick of the starting cord. Costs less than 3¢ an hour to operate. Send for catalog!

ELTO PAL *only* **$37.50**

Elto PAL (built by Evinrude) weighs only 14 pounds, and drives boats at twice the speed of oars. Elto ACE, $47.50 — the husky Handitwin, only $67.50. Each an outstanding value! Address EVINRUDE MOTORS, 5437 N. 27th St. Milwaukee

Prices F. O. B. Factory



FREE Catalogs! Write for 1938 Evinrude and Elto catalogs . . . Boat Directory and Boat-and-Motor Selector.

EVINRUDE OUTBOARD MOTORS

CATCH MORE FISH
Send for FREE BAIT BOOK

This practical handbook, for fishermen, is a fascinating, reliable guide to better fishing! It tells how and why Creek Chub True-to-Nature Lures and Flies Catch More and Bigger Fish! Beautifully illustrated! Sent FREE upon request!

CREEK CHUB BAIT COMPANY
514 Randolph St. Garrett, Ind.

PIONEER
non-sinkable
BOATS

12 Models
34 Sizes
$25 to $167.50

Time tested for 27 years—America's outstanding values in Row Boats, Play Boats, Fishing, Hunting, Outboard Motor, Ice and Sail Boats! Always ready to use! Endorsed by leading summer camps and resorts! Send post card for 24-page catalog! It's FREE!

PIONEER MFG. CO., 514 Perry St., Middlebury, Ind.

FISHERMEN
GET THIS THRILLING NEW
BOOK ON FISHING *Free!*

"Ozark Ripley Tells About Fishing." Page after page of thrills covering *all types* of angling—written by Ozark Ripley, master fisherman. Also valuable information on outboard motors and boats. Write for your copy. *Free!* JOHNSON MOTORS, 711 Pershing Road, Waukegan, Ill.

Early Skunk Cabbage

Elizabeth H. Moore of Millville, N. J., thinks that there must be something in the claim that winters are getting milder. She writes that she has been accustomed to find skunk cabbage in southern New Jersey during the last half of February, but that several plants found blooming on January 23, 1938, seemed to suggest a new record.

We thought so, too, until our Associate Editor informed us that, several years ago, having decided to beat all early records for skunk cabbage blooms, he hunted up a whole colony of sprightly blossoms on January first, in nearby Virginia. The only reason that he did not try on Christmas Day was the thought that such a record would bring up the question as to whether it constituted an early or a late appearance.

School Gardens

Since the School Garden Association of America registered the first Nature-Garden Club early in 1935, more than 2000 of these groups of boys and girls, representing upward of 50,000 members in twenty-three states, have been formed. Nature-Garden Clubs are sponsored by schools and other groups as a means of teaching elementary science in an informal manner. The activities of the clubs are easily adaptable to all age-levels and clubs are registered in schools ranging from primary grades to the junior college. For a leaflet that gives complete information about this interesting project, address Karl H. Blanch, Chairman, National Committee on Nature-Garden Clubs, East Mauch Chunk, Pa.

Submarine Telescope

It is now possible to spy on submarine life in tidal pools, or in any water not too deep, through a new submarine micro-telescope that has just come to our attention. We haven't tried one out ourselves, but it is claimed that with clear water and good light it is possible to see objects at a depth of from twenty to thirty feet, these objects being slightly magnified also. Beside providing opportunity to study underwater life without recourse to diving bells, it is suggested that the device enables a boatman to see what is fouling his propeller, or what happened to the sparkplug he dropped overboard. Probably someone will think up other uses. In accordance with our policy of keeping commerce out of the editorial columns we will be glad to put any interested readers in touch with the distributor.

Heard on the CONTINENTAL LIMITED

"WHAT THRILLING SCENERY HERE AT JASPER!"

Enjoy an Alpine Vacation in the CANADIAN ROCKIES

HERE is a vacation you'll never forget! Golf. Riding. Hiking. Loafing. Swimming. A new motor drive to the *Columbia Icefield,* one of the world's most thrilling sights! All amid the unspoiled grandeur of the mightiest peaks in the Canadian Rockies! You'll like the luxury and social life at Canadian National's Jasper Park Lodge. Rates with meals from $7.00 a day.

Then on to ALASKA!

After Jasper, take the colorful Canadian National cruise to Alaska. Sail on palatial steamships from Vancouver or Prince Rupert through the thousand mile Sheltered Inside Passage.

Low rail fares. Come by the air-conditioned ***Continental Limited.*** *Call or write any Canadian National office for descriptive booklets.*

Boston.....186 Tremont St.
Buffalo..22 No. Division St.
Chicago, 4 S. Michigan Ave.
Cincinnati, 206 Dixie Term. Bldg.
Detroit, 1239 Washington Blvd.
Duluth, 428 W. Superior St.
Kansas City, 414 Fairfax Bldg.
Los Angeles 607 S. Grand Ave.
Minneapolis, 634 Marquette Ave.
New York...673 Fifth Ave.
Philadelphia, 1500 Chestnut St.
Pittsburgh...355 Fifth Ave.
Portland, Me....G.T.R. Sta.
San Francisco, 648 Market St.
Seattle...1329 Fourth Ave.
St. Louis, 314 No. Broadway
St. Paul, First Nat. Bk. Bldg.
Washington, D. C., 922 15th St., N. W.
Montreal, Que., 360 McGill St.

CANADIAN NATIONAL
to Everywhere in Canada

RAILWAYS • STEAMSHIPS • AIRLINES
HOTELS • TELEGRAPHS • EXPRESS

"Get a WOODS Arctic Down Sleeping Robe"

All Under and Over You Warm Down from Northern Waterfowl

GET a good night's sleep always, in any camp, any weather, in your Spring-to-Fall 2-Star Woods Arctic Down Robe. Exclusive insulation of Woods Everlive down from Northern waterfowl, Nature's best. No-draft ventilation. Solid comfort for indoor temperatures down to freezing. Lining, cozy wool flannel. Special water-repellent cover of windbreaker fabric.

Send for FREE Catalog

Woods 2-Star Robe with choice of Talon (hookless) or Lift-the-Dot fastening with wide down-filled underlap. Large $55.00, medium $46.00. Other robes from $18.75 to $63.50. See them at your dealer's, or order direct from us—no shipping charge anywhere in the U. S.

WOODS MFG. CO., Ltd., 3812 Lake St., Ogdensburg, N. Y. *In Canada, Ottawa, Ont.*

OF EDWARD I OF ENGLAND..

The ROSE

All of us have our favorite flowers *but so have damaging insects.* Experienced gardeners know that to bring out the full bloom and beauty of any flower, it must be protected against insect destruction. "Black Leaf 40" used regularly according to directions helps keep your garden free of certain insect pests.

ECONOMICAL

"Black Leaf 40" is economical—a little makes a lot of spray. Kills insects both by contact and by fumes. Has many other valuable uses too, as described on label and in free leaflets. *"Black Leaf 40" is sold by dealers everywhere.*

TOBACCO BY-PRODUCTS & CHEMICAL CORP. INCORPORATED • LOUISVILLE, KENTUCKY

Insist on original factory-sealed packages for full strength.

"Black Leaf 40"

3802

LOOK FOR THE LEAF ON THE PACKAGE

MOW with ONE HAND

FREE LITERATURE—

Write EVINRUDE 1730 W. Hope Ave Milwaukee, Wis.

Handiest power mower ever built—only one with easy one-hand control—cuts 18" swaths; mows large lawns in quarter of time for only 5c fuel cost. Quiet, easy starting 4-cycle motor; adjustable cutting heights; rubber tires. Easy terms. Model "D" $110, Model "S" shown, $89.50

EVINRUDE LAWN-BOY

New CACTUS

Grow these wonderfully interesting and beautiful flowering plants. Write for my new Free catalog, 16 pages of colored pictures and descriptions. A fascinating hobby for the window gardener or apartment house dweller. Grow anywhere! Johnson Cactus Gardens, Box 2-B, Hynes, Calif.

KINKADE GARDEN TRACTOR and Power Lawnmower

A Practical Power Plow and Cultivator for Gardeners, Suburbanites, Florists, Truckers, Nurserymen, Fruit Growers

Low Prices - Easy Terms

American Farm Machine Co. 1036 33rd Av. SE. Minneapolis, Minn.

Catalog Free

FREE BOOK WATER GARDENS AND GOLD FISH

Beldt's Aquarium

WATER LILIES

All colors; hardy, day and night bloomers; aquarium plants; complete water gardens.

Tropical & Gold Fish

Rare species; collections at reasonable prices. See them in the

FREE CATALOG IN COLORS

SPECIAL: one yellow, one white hardy lily and 2 water hyacinths. Postpaid in U. S. for $1.00.

Beldt's Aquarium 2150 Crescent Ave., St. Louis, Mo.

NATURE SCIENCE SERIES

By Clyde Fisher and Marion L. Langham

Six Book Series—Grades 1 to 6. Price, $.96 each

A modern type of Supplementary Reader containing facts, stories, poems and legends about Nature. Illustrations in color.

For complete descriptive literature, write to:

NOBLE AND NOBLE 100 FIFTH AVE., NEW YORK

INDOORS AND OUT

(Continued from page 199)

of the Corwin (1917), and *Steep Trails* (1918). His letters, rich in content and eloquent in expression, form the major part of William Frederick Bade's two-volume *The Life and Letters of John Muir.*

I have just re-read all of these volumes, and I can think of no more fitting or profitable way of celebrating John Muir's centennial. There is no doubt of their enduring literary qualities, and they are invaluable descriptions, descriptions that re-create the spirit of the wilderness areas that Muir knew better than anyone else and that, sadly enough, in large part can never be known now by anyone else. Yet even the extent to which they can be experienced by travelers today is also in great measure the result of John Muir's contribution to conservation. He was an indefatigable crusader for national parks and national forests, for he had a prophet's insight that "thousands of tired, nerve-shaken, over-civilized people are beginning to find out that going to the mountains is going home; that wildness is a necessity; and that mountain parks and reservations are useful not only as fountains of timber and irrigating rivers, but as fountains of life." His own descriptions and personal testimonies made this convincingly real to his readers, and still do. It will be a sorry time if the pressure of current writings ever forces John Muir from the attention of American readers. Every reader of John Muir must surely have his "faith in Nature's beauty strengthened" and must surely see "more clearly that beauty is universal and immortal, above, beneath, on land and sea, mountain and plain, in heat and cold, light and darkness." The words are Muir's own, wrested from their context but applicable, and there are none more aptly and eloquently expressive.

S. Hall Young, the missionary who owned the dog Stickeen and had the rare experience of traveling with John Muir, has frankly expressed in his *Alaska Days with John Muir* a tribute in which there must be thousands who would join in this centennial year. Of his first meeting with Muir, Young wrote: "I began to recognize him as my master who was to lead me into enchanting regions of beauty and mystery, which without his aid must have forever remained unseen by the eyes of my soul. I sat at his feet; and at the feet of his spirit I still sit . . . as this 'priest of Nature's inmost shrine' unfolds to me the secrets of his 'mountains of God'."

"DING" LEADS AGAIN

(Continued from page 241)

session is made in our editorial on page 233).

C. M. Palmer, Jr., of the American Wildlife Institute, deserves great credit for the arrangement of a valuable and well-balanced program. If one were to attempt to evaluate the meeting briefly we believe it fair to say that it reflected progress; that it indicated an increased realization of the need of scientific knowledge upon which to base control of wildlife taking; that the die-hard, have-your-cake-and-eat-it-too viewpoint of sportsmen is losing ground. R. W. W.

Story of Sperry Glacier

To anyone who has visited Glacier National Park and climbed to Sperry Glacier, *Avalanche* will be a treasure discovered. This is the title of a book by Albert L. Sperry, Minnesota lawyer, who, as a young man, went with his uncle, the late Dr. Lyman Beecher Sperry, on the expeditions of exploration into what is now Glacier Park, and where they discovered the glacier that now bears the name of Sperry. These trips took place in 1894, 1895 and 1897. The territory covered by these trips included much of the Park now known to automobile visitors; more that is still accessible only by trail. It is fascinating to one knowing this region as it is today to be carried back, through this book, to the wilderness of four decades ago. Mr. Sperry makes no pretence at literary flourish. He pictures the guides and trappers of the region, no few of whom were there because it was unhealthy elsewhere; describes simply the adventures and the thrills of exploration; recreates, in fact, a valuable item in the history of western exploration. Mr. Sperry's story is supplemented by reproduction of twenty-four pictures taken by Shepard, the photographer of the expeditions. In fact, Mr. Sperry carried the plates on his back on many a hazardous climb, from which it was a real achievement to bring any back in one piece. It would have been a loss if this record had not been preserved in *Avalanche.* The book is published by The Christopher Publishing House, Boston, at $2.50.

Oxygen for Fish

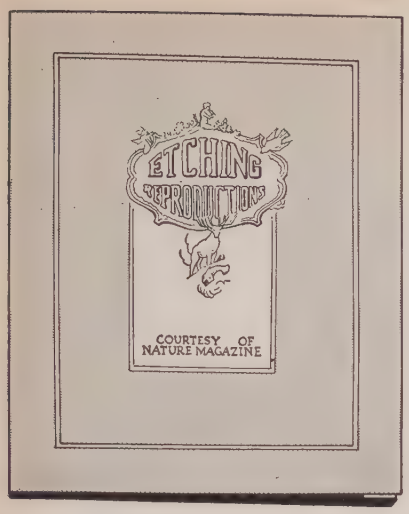
Although it's a bit late to bring it up now, we have learned of a device designed to pump oxygen into heavily-frozen lakes and thus prevent loss of fish life through suffocation. It seems to be something that would be of interest to conservation commissions in the northern states and to owners of private lakes. Space does not permit extended discussion of this pump, but we would be glad to put interested readers in touch with the maker in anticipation of another winter.

THE SCHOOL PAGE

(Continued from page 246)

Possibly the field of natural science in which sequences show least variation is that of astronomy. An article, such as the current one by Mrs. Lewis, prepared some weeks ago, can predict with accuracy what will be observable at a particular place at a particular time. Recognition of these sequences through the twenty-four-hour cycle and through the year should be a part of any study of this subject. It is strange that such an exact science has associated with it so many superstitions and so many practices that have no basis in fact.

Variation in speed of changes makes a worthwhile study. In the bullfrog tadpole shown in this issue the changes just before transformation are much more rapid than those that preceded them. There is a difference in the speed with which the front legs and the hind legs develop, and the mouth changes its shape slowly for some time, and then rapidly. Why are these sudden changes necessary when at other times there is no need of haste, and what changes in habit and habitat accompany these changes in struc-



50 cents a set, postage prepaid

★

Portfolios of Etching Reproductions

Eight Nature Etching Reproductions 9 x 12 inches in size, carefully selected from a large number of the best works of famous etchers of wild life, and inserted in an attractive portfolio.

Will Simmons . Polar Maternity
Diana Thorne . Making a Beseech
Richard E. Bishop . The Osprey
Charles Emile Heil . Chewinks
Winifred Austin . Pheasant Brood
L. R. Brightwell . Not Interested
Roland Clark . Gathering of the Clan
Carl Rungius . Lord of the Canyon

From the hands of famous etchers

50c a Set

while they last

Send your order today!

AMERICAN NATURE ASSOCIATION
1214 Sixteenth St., N.W., Washington, D. C.

ture? Most of these questions will not be answered in books but may be answered by the use of plain horse sense.

Next month this page will not be devoted to the discussion of materials for use in classes, but to a survey of the offerings in summer schools for those wishing to improve their teaching in the Nature study field. The article in this issue on the excellent work being done at the Audubon Society camp may be taken as an introduction to this page for next month. There is such variation in equipment, staff, programs and methods in the different summer Nature camps that there should be some clearing house for those interested. This page will try to provide this survey next month. Later in the year there will be a page dealing with the work being done in the summer camps for children. This will be based on current returns from more than two hundred such camps.

White Admiral

All his life a collector of butterflies, A. Max Van Duzer of Cleveland enjoys looking back in particular on one of his many collecting experiences in the past. He writes that he was going to work one morning when he was a stripling of twenty. He had on his best suit and new straw hat because he had a date with a girl after work. As he was passing the home of the late John D. Rockefeller he spotted a butterfly that turned out to be a white admiral, not native to that section. Special raiment forgotten, he went over the fence into Mr. Rockefeller's front yard and with his new straw captured the prize from a bush. He feels that it must have developed from a pupa brought to Cleveland. In any event it was in his butterfly case for years, referred to as "Mr. Rockefeller's butterfly."

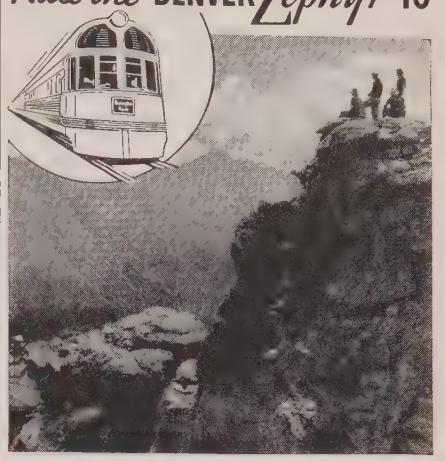
Meet the Trees

Knowing Your Trees is the title of a splendid book by C. H. Collingwood. Bringing together within one cover the fine series of tree identification articles that have appeared in *American Forests,* this book should be particularly valuable in schools, Boy and Girl Scout libraries and anywhere that a book on our better-known trees is needed. Each popular discussion of a tree is illustrated with pictures showing the tree in summer and winter (in the case of hardwoods), the leaves or needles, the fruit, the bark and a map showing the range. Twenty-eight conifers and twenty-two deciduous trees are covered. The book is available from The American Forestry Association, 919 17th Street, Washington, D. C., for one dollar.

1938 Grasshoppers

Predictions from the United States Bureau of Entomology indicate that grasshoppers may do more damage during 1938 than they did last year. Lee A. Strong, Chief of the Bureau, points out that the late summer and fall were favorable to grasshopper increase. In fact, an extra generation appeared in the fall, causing much damage. Control plans are being made. Unfortunately, however, our reduced population of birds that enjoy large meals of grasshoppers cannot be quickly increased to be enlisted as the important allies that they are.

Ride the DENVER *Zephyr* TO



A MARVELOUS VACATION IN

COOL COLORADO

● What more perfect vacation spot than cool, colorful Colorado—nestled in the refreshing, invigorating Rockies?

● And what more perfect way to get there than in the air-conditioned luxury of one of Burlington's wonder trains—the DENVER ZEPHYRS?

● These diesel-powered, stainless steel streamlined flyers offer every conceivable accommodation—at *no excess fare.* Their speedy 16-hour schedule gives you *two extra days* in glorious Colorado. Denver with its renowned mountain parks—enchanting Colorado Springs—majestic Pikes Peak—Boulder and the alpine beauty of Estes Park.

● Burlington's special summer fares are amazingly low. You'll be surprised how little a vacation in cool Colorado will cost. Whether you travel independently or join a congenial ALL-EXPENSE ESCORTED TOUR PARTY, "Go Burlington" for the greatest travel value. In addition to the Denver Zephyrs, these luxurious air-conditioned Burlington flyers:

THE ARISTOCRAT—*Chicago—Denver*
OVERLAND EXPRESS—*Chicago—Denver*
COLORADO LIMITED—*St. Louis—Denver*

To California by way of Colorado. Enjoy more than a thousand miles between Chicago and Denver aboard the Denver Zephyr with almost a full day in the beautiful Capital City of Colorado without loss of time en route. Speedy, convenient routing from Denver, through Salt Lake City, to the coast. One of the country's most scenic routes.

Burlington Route — Way of the Zephyrs

MAIL THIS COUPON TODAY

Burlington Travel Bureau
Room 1537, 547 W. Jackson Blvd., Chicago, Ill.
Send me your free illustrated booklets, rates and information about Colorado Vacations.

Name _____

Street and Number _____

City _____ State _____

☐ Check here for special information about All-expense Escorted Tours

WORMS KILL MANY DOGS

Worms may cause fits and convulsions, often with fatal results. Take no chances —worm your puppy or dog with Glover's Worm Medicines. In capsule form for Round Worms (Ascarids), Hook Worms and Tape Worms. Also Liquid Vermifuge for Round Worms (Ascarids).

Popular with many dog fanciers—

The New GLOVER'S *Double Action* CAPSULES

An effective combination of medicines to expel both Round Worms (Ascarids) and Hook Worms in puppies and dogs.

Write for new FREE DOG BOOK— address

GLOVER'S

Dept. 32, 462 Fourth Avenue, New York City

DOGS

ST. BERNARDS—The kind you've wanted!! Dime brings interesting photographic particulars. Royal Kennels, #18, Chazy, N. Y.

DON'T TAKE A CHANCE ON YOUR DOG'S HEALTH. MAKE SURE OF IT BY USING RELIABLE FOODS AND MEDICINES.

GARDEN NOVELTY - DAINTY GIFT

5 Hummingbird Feeders $1.50 Postpaid

Gem colors—Ruby, Topaz Sapphire.

Stained glass flowers lure ruby-throated emerald gems of flashing flight. "Just add sugar and water and serve."

WINTHROP PACKARD
1433 Washington St., Canton, Mass.

THE IMPORTANT PART OF A BIRD HOUSE — ITS INSIDE

—SURE NEST—

The Berlepsch type scientific Bird House. Recommended by Audubon Societies.

COPIED FROM THE WOODPECKERS. MADE FROM A NATURAL PIECE OF LOG.

For all hole nesting birds, from Wren to Bluebird, Chickadee and Downy Woodpecker-Bluebird size. State for pole or tree.

$1.90 post paid, West of Miss. 35c extra.
H. HUWERTH, EMPORIUM, PA. Box 420

Keep Your Dogs *free* FROM WORMS

WRITE FOR FREE BOOKLET No. 652

NEMA WORM CAPSULES

EFFECTIVELY REMOVE LARGE ROUNDWORMS AND HOOKWORMS IN DOGS OF ALL BREEDS AND AGES. SAFE. DEPENDABLE

Nema Booklet tells you about worms

Address Desk N-21-D *Animal Industry Dept.*
PARKE, DAVIS & CO., DETROIT, MICH.
Drug Stores Sell Parke-Davis Products

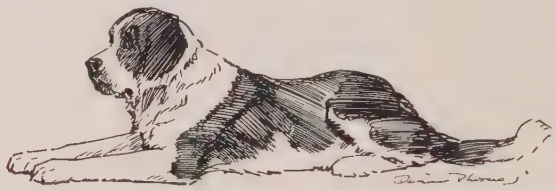
Diana Thorne's DOG COLUMN

NOW AND AGAIN "man's best friend" falls from grace, as it were, by some act surprising in its departure from the expected, and awkward in its consequences. Perhaps he loses his grip on himself through unsuspected sickness; or reverts to the primitive through momentary aberration; or, simply, forgets the obligations of his training.

The reasons for such lapses are generally not easy to determine but the amazement they cause is immense and widespread. It is "news" and is given more attention than any item on the age-long tale of canine self-sacrifice and service, docility, intelligence and devotion.

In the spring of last year the wonderful record of humane service rendered by the monks of St. Bernard and their dogs was reported to have been marred for the first time in its history by an outbreak of temperament on the part of one of the dogs. A small girl visitor was the victim. The dog, it is said, rushing with others down the ice-slope to welcome visitors, attacked the child, who died as a result. It is not possible to determine all the factors involved in the assault—if assault it was—nor is it profitable to speculate.

What is most remarkable is the public outcry and astonishment at a rare case of canine misbehavior, particularly when one considers the daily newspapers' records of the human performance! Regret and dismay that it was a St. Bernard in this case is natural. But, the daily toll of capture and execution of felons is not exactly a good reason for the condemnation of the character of the entire human species!



In a little brochure, *The Dog,* Hon. Harry B. Hawes gives us thoughts of rare value. When, in it, the author says, incidentally, "man is taught chivalry; the dog has it naturally", he is, in the vernacular, saying something! "The point of view is everything", as the man said when he looked through the wide end of the telescope.

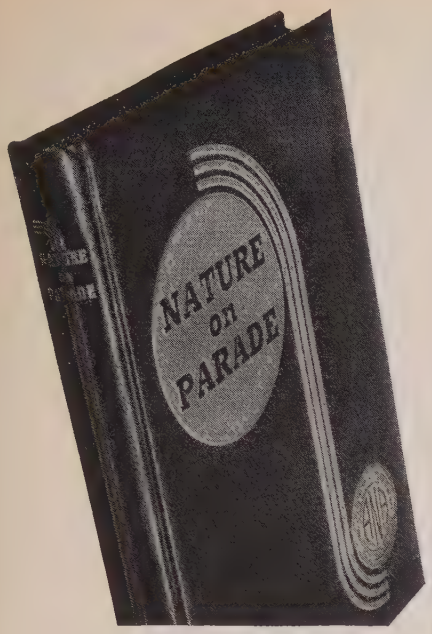
An English prelate, who has been much in the news recently as self-appointed dictator, was asked on one occasion to subscribe to the S. P. C. A. He retorted: "You may be doing good, sir, but I am informed that you consider fox-hunting cruel. Dash it, sir, I ride to hounds every week!"

Another sporting Bishop declared solemnly that the fox, the stag and the hare were deliberately provided by a kindly Providence to be chased to death for the amusement and benefit of man. He capped his discourse with the comforting assurance to his audience that they (the animals) were aware of and appreciated their destiny!

In the days when bear-baiting and dog-fighting were sports graced by the courts and in popular esteem, the bouts were blessed by the clergy. Which reminds us of the small girl, who, looking at a picture of Christians being mauled by tigers and lions in a Roman arena, exclaimed, "Oh, look, mama! There is a poor lion without any Christian to eat!"

But, to return from these random and perhaps not too pertinent thoughts, to the St. Bernard.

The monks of the hospice there high on the Alps were the fore-runners of the Red Cross idea. Necessarily their activities were locally restricted, but the history of their achievements in the training of their dogs as first-aid bearers, scouts, path-finders and a general intelligence service makes thrilling reading.



NATURE on PARADE

$5.00

An album of more than one thousand of the finest Nature Photographs ever taken

A beautiful book, size 9 x 12, 388 pages, bound in dark green imitation leather, Spanish grain, soft padded cover, stamped in gold leaf.

Since NATURE MAGAZINE made its bow in January, 1923, thousands of Nature pictures have been reproduced on its pages. These constitute the most remarkable pictorial parade of Nature ever published. The editors of Nature Magazine have reached out to gather together the best in Nature pictorial features, presenting them through the graphic process of rotogravure. More than one thousand outstanding Nature pictures are presented, with descriptive story relating to them. They unfold the camera's record of the life history of birds, mammals, or insects; or they represent typical flowers, trees, and other Nature forms of a certain region. A book of surpassing beauty and constant interest.

The edition is limited to one thousand numbered copies

Mail your order today

American Nature Association
1214 Sixteenth St., N. W., Washington, D. C.

Enclosed find $..... for ..... numbered copies of NATURE ON PARADE.

Name .....

St. & No. .....

City & State .....

The origin of the breed dates back to a St. Bernard de Menthon in the Tenth Century, the training and breeding of the type being done in the Monastery, and, later on, carried on by other monks elsewhere. The Alpine settlement was established about 1750.

Thenceforward the dog known as St. Bernard received attention from English breeders, who contributed much to the development of the rough-coated variety, the smooth being less popular.

As companion, child's nurse, guardian of home, the dog is to be highly praised. Today it is a dog too bulky for congested city dwelling, but in the country, where there is a certain amount of freedom, the St. Bernard will contribute much joy to his master's household.

On Dog Care

Although primarily of interest to veterinarians, or owners of dogs in quantity, *Diseases and Surgery of the Dog* contains much general information on disease symptoms and canine care that could be profitably read by many dog owners. Written by Raymond J. Garbutt, D. V. S. chief veterinarian of the American Society for the Prevention of Cruelty to Animals, the book is as authoritative as it is helpful. The author expresses the hope that it will be useful in communities where veterinary service is difficult to obtain and in cases where first aid can be rendered pending arrival of the doctor. This volume appears to be a distinct and distinguished addition to the dog books. It is published by Orange Judd Publishing Company, New York, at $3.50.

W.P.A. and Science

Many jokes have been coined and cartoons drawn at the expense of Works Progress Administration projects. While some of these may be justified in the light of the pressure to provide work, at the same time many things of permanent value have been done. Artists and scientists, both veteran and recently from college, have been employed to the number of 2774 during 1937 on museum projects. Working at classification, mounting specimens, cataloging, typing of manuscripts and records, and the like, these people have been able to do work that has great scientific, if not spectacular, value. An example is found in the case of one trained entomologist who, at the Field Museum, studied 6393 specimens of lepidopterous insects, and labeled 792 species not previously identified, in addition to clarifying thousands of other labels. Many other museums have similarly benefited and have been able to do work that has long needed doing.

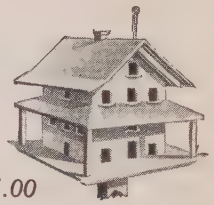
Northeastern Trees

An excellent guide to the native and naturalized trees of the northeastern United States is the result of a revised and enlarged edition of *Trees of New York State* by H. P. Brown. The title of the expanded volume is *Trees of Northeastern United States*. The author provides leaf, fruit and twig keys to the species, and each discussion of an individual species is accompanied by clear and sufficiently large line drawings to round out the educational values of the book. The volume is published by Christopher Publishing House, Boston, at three dollars.

ONE *Martin* DESTROYS 2000 MOSQUITOES A DAY

"Attract martins to your grounds," says Joseph H. Dodson, "and get rid of mosquitoes. 36 other birds attack codling moths which destroy millions of dollars worth of fruit each year. Yellow-breasted warblers kill tree lice. Scarlet tanagers devour gypsy moths. A flicker consumes 5,000 ants a day. Everybody loves to hear birds sing, but few people realize how beneficial they are. My houses will lure song birds to your home."

28-Room
Martin "Cottage"
26" high
$18.00
f.o.b. Kankakee
Other sizes to $85.00



Because of the peculiar interior construction of Dodson Martin Houses, being perfectly ventilated without draft, they rarely if ever fail to attract these valuable birds.
Everywhere Dodson Bird Houses are recognized as the finest made. There is a model for every desirable bird. Send for free catalog showing complete line.

"Your Bird Friends and How to Win Them"

Mr. Dodson, America's foremost bird authority and builder of bird sanctuaries, tells in this interesting 32-page book how easy it is to attract useful and beautiful birds to your premises. Send for free copy.

JOSEPH H. DODSON CO.
719 HARRISON AVE., KANKAKEE, ILL.

How Would You Like to Wear a Fur Coat All Summer

Keep your dog FIT with KRETOL BRAND

Kretol Dog Shampoo (Pine)
Makes the dog's coat soft and glossy. Cleans skin. Eliminates fleas and dog odors.

Kretol Pine Disinfectant
Destroys disease germs. Rids dog of fleas. Eliminates dog odors, and leaves a mild piney fragrance.

Kretol Odorless Insecticide
Kills fleas and household insects. Odorless, stainless, tasteless and harmless to humans and animals.

Kretol Products used by leading veterinarians for over 50 years.

Special trial size, 35c; Pints, 65c; Quarts, $1.00. Prepaid Postage.

Take advantage of this special offer. Mention Nature Magazine

KRETOL CO., INC.
(Est. 1886)
Dept. N438
2033 K St., N. W., Washington, D. C.

CLASSIFIED ADVERTISING

BIRDS

PHEASANTS and DOVES, fifty varieties, special Ringneck and White Sacred Doves $2.50 per pair. **L'Chauwiechen Farms, Gt. Barrington, Mass.**

RAISE PHEASANTS—Profit or pleasure. Send 3c stamp for pamphlet. **Rainbow Farm Pheasantry, Barrington, Illinois**

BOOKS

"HOW to Know the Insects." Widely used authority on collecting, mounting and naming them. Complete, easily understood, scientifically reliable. 140 pages, 300 illustrations. Spiral $1.00, Cloth $1.80 postpaid. Money back if unsatisfactory. **H. E. Jaques, Box N, Mt. Pleasant, Iowa.**

OUR ILLUSTRATED CATALOG FREE—Containing 96 pages, embraces a selected group of books for Farmers, Flower, Vegetable and Fruit Growers, Florists, Nurserymen, Stock Raisers, Dairymen, Poultrymen, Dog Breeders, Housekeepers, Mechanics, Sportsmen. Whatever your hobby we have a book about it to make it more interesting. Founded 1836. **Orange Judd Publishing Company, 16 East 26th Street, New York City.**

BUTTERFLIES

INDO-AUSTRALIAN butterflies 15 for $1.00; from Madagascar 10 for $1.00; from South America 15 for $1.00. No two alike, perfect and named. Guaranteed living cocoons 12 for $1.00 including Luna and Io. Entomological supplies. List free. **BUTTERFLY WORLD SUPPLY HOUSE, 297 E. 98th St., Brooklyn, N. Y.**

$1.00 BARGAINS: 20 Cocoons (including Luna); 20 American Butterflies; 15 Brazilian Butterflies; 500 Insect Pins (Black); or 500 Micro Pins. Collapsible Insect Net, $2.10. Cresson Pinning Forceps, $5.50; Nature Guides, 10c. Silkworm Eggs (25), 25c. Praying Mantis Eggs, 25c. Free Lists. **ENTOMOLOGICAL HOUSE, 923 W. Johnson, Madison, Wis.**

COCOONS; the original $1.00 dozen including Luna, Io; others 50c dozen up. **MAYNARD, 1192 Lewiston, Rochester, N. Y.**

FILMS DEVELOPED

FILMS DEVELOPED. Two beautiful, glossy, double weight, professional enlargements and 8 prints all for 25 cents (coin). Re-prints 3 cents. Dependable quality and service. **Allied Photo Service Company, Drawer 289, Sparta, Wisconsin.**

IMMEDIATE SERVICE! PICTURES RETURNED the same day film is received. Two beautiful Heavyweight professional enlargements and eight guaranteed Never-fade prints all for 25c coin. Sixteen pictures from roll 25c. Eight beautiful enlargements from roll only 25c. Candid Rolls Developed FREE!—Prints enlarged to 3 x 4, only 4c each. **AMERICAN STUDIOS, Dept. M, La Crosse, Wis.**

ROLLS DEVELOPED. TWO Beautiful Double Weight Professional Enlargements, 8 Never Fade Prints 25c. **Century Photo Service, Box 829, La Crosse, Wis.**

HORTICULTURAL

RHODODENDRONS MAXIMUM, Mountain Laurel, Flame Azalea, Hemlock, 2 to 3 ft. 10, $1.60. 100, $14.00. List Free. **ALPINE SHRUBBERY, Rt. #5, Johnson City, Tenn.**

EVERGREENS. Beautify your grounds with Rhododendron Maximum, Flowering Dogwood, Mountain Laurel, Canadian Hemlock, Azalea, and Red Cedar. Write for wholesale price list. **Appalachian Evergreen Company, Doeville, Tennessee**

FANCY LEAVED CALADIUMS. Nature's loveliest summer bedding and foliage plants for house, window box or conservatory. Gorgeous colors from white to pink and deep scarlet in intermediate shades. Easily grown. 10 bulbs mixed varieties $1.25 for $2. 3 finest named varieties, 4 of each $2.00. The two collections, 22 bulbs $2.50. All postpaid. No catalogue. **J. D. Mitchell, Box 356, Sebring, Fla.**

HARDY wild flowers—Rhododendrons—Catalogue. **The Three Laurels, Marshall, N. C.**

INDIAN CURIOS

PREHISTORIC AND EARLY Modern Indian Relics, Old Arms, Fossils, Minerals. Illustrated lists ten cents. **N. Carter, Elkhorn, Wisconsin.**

100 Good ancient arrowheads $3.00; Tomahawk head 50c. Flint knife 25c. Illustrated catalog 5c. **H. Daniel, Hot Springs, Arkansas**

INDIAN Relics, beadwork, coins, minerals, books, curios, weapons. Catalog 5c. **Indian Museum, Northbranch, Kansas.**

INSTRUCTIONS IN PENMANSHIP

BEAUTIFUL PENMANSHIP—Inexpensive course—Handwritten specimens for stamp. **J. Hotell, Ravine, Hastings-on-Hudson, New York.**

PETS

YOUNG prairie dogs. Excellent pets. Each $1.50. Pair $2.50. Deer mice, squirrels, harmless snakes, lizards, etc. **Alva Rock, Wallace, Kansas.**

PHOTOGRAPHY

"HOW TO MAKE GOOD PICTURES". Twenty-third edition now available. Up to date in every respect with details of Kodachrome and Infra-Red photography; new chapters include Stunt Photography, Flower Photography, Night Photography, Indoor Portraiture, Composition and many more new features. At 50c this book still remains at the head of our "must" list. **NATURE BOOK DISTRIBUTORS, 1214 16th Street, Washington, D. C.**

INCOME from your camera instead of expense. Low-cost, home study course teaches you to make photographs for magazines, newspapers, advertisers. Tremendous demand. Earn good money wherever you live. Free book. **Universal Photographers, Dept. C, 10 West 33rd Street, New York.**

PICTURES

BIRD PICTURES! Handmade from natural-colored feathers. Very beautiful. Samples 25c. **Lieske Sales Company, Box 557, Chicago, Illinois.**

REAL ESTATE RESORT—CANADA

CANADIAN Tax Sale Lands for a Dollar an acre and up. Hunting, fishing camps. See advertisement page 249. **TAX SALE SERVICE, 72 Queen Street West, Toronto, Canada.**

SCIENTIFIC

ZEISS Binoculars, Spotting Telescopes, Leica Cameras; bargain list #380 free. **Brownscope Company, 5 West 27th Street, New York.**

TELESCOPES, Microscopes, Binoculars, Mineralogy, Chemistry. Catalog free. **Teeko, Evanston, Illinois.**

SEA SHELLS

SCIENTIFICALLY labelled shells—25 colorful Cuban shells $1.00, 40 California $1.00. Catalogue free. **Sea Shell House, 1611 South Elena, Redondo Beach, Calif.**

"EAST COAST MARINE SHELLS"—Maine to Texas inclusive. A valuable new book with more than a thousand, mostly new, drawings and photographs: instructions for collecting and studying shells. Write for free sample pages, obtainable from author, **Maxwell Smith, Lantana, Florida.**

SONG POEMS WANTED

WANTED original poems, songs, for immediate consideration. Send poems to **Columbia Music Publishers Ltd., Dept. 161, Toronto, Can.**

SQUABS

RECEIVE weekly checks. Learn squab ways. Thousands wanted daily. Write **Rice Farm, Box 804, Melrose, Mass.**, for revealing free picture book.

TAXIDERMY

TAXIDERMY SUPPLIES—QUALITY Artificial Eyes, Teeth, genuine Jonas head forms. Tools, materials, etc. Everything for the progressive taxidermist. Send 10c for big illustrated catalog. **Jonas Bros., 1023 Broadway, Denver, Colorado.**

USEFUL INSECTS

LIVE INSECT PARASITES AND PREDATORS. Observe the intensely interesting and spectacular activities of man's friends of the insect world. For example: 200 tiny parasitic wasps, List No. T-1, with all materials and easily followed directions for increasing to 1600. Airmailed for $1.00. Information on request. **California Insectaries, Inc., 1612 West Glenoaks Blvd., Glendale, Calif.**

WILD FLOWERS

ALASKA WILDFLOWER SEEDS. Catalog. **Caribou Island Seeds. Caribou Island. Seward, Alaska.**

IN COLORS—60 post cards, 25c doz.; 64 2 x 3 in. stickers 55c; book of 365, $3.95; 50 lantern slides & lecture rented, 1 day $3.75 & postage. Books, slides or photos (7000), movie films, seeds. Membership & magazine $1.50 a year; Junior Chapters of 25 or more 10c per member. **Wild Flower Preservation Society, 3470 Oliver St., Washington, D. C.**

FOR RENT

FOR Rent. Island home, Rainy Lake, completely equipped for twelve. Three cabins. Summer season, $1,000. **E. C. Oberholtzer, Ranier, Minnesota.**

Bulletins for Members

A limited number of American Nature Association Bulletins of an early series are still available to members for a three-cent stamp each to cover the cost of mailing. These are:

No. 25—How to Form a Nature Club.
No. 32—Gardens Under Glass.
No. 34—Relating Home and Garden.
No. 35—Garden Roses.
No. 39—How to Care for Canary Pets.
No. 40—How to Make and Maintain Your Lawn.
No. 41—Camp Cookery.

Other Association bulletins are in preparation. Send your request, with necessary stamps, to:

Membership Service

AMERICAN NATURE ASSOCIATION
1214 Sixteenth Street Washington, D. C.

PERSONAL STATIONERY

$1.00 POST PAID — 250 Note Sheets (Size 6" x 7") with 125 Envelopes, or 125 Double-Sheets with 125 Envelopes.

Each sheet and envelope is neatly printed with your name and address in rich dark blue ink.

Send only $1.00 (Check, Cash, or Money Order)

$1.20 WEST OF MISSISSIPPI

GREEN BROTHERS
119 FRONT STREET, DUNELLEN, N. J.

Sells 19 Features In Six Months

"I have sold, up to date, nineteen features to the Detroit Free Press and have been made their correspondent here," writes Mrs. Leonard Sanders of 218 Union St., Milford, Mich., on completing the N.I.A. course. Her skilful handling of feature stories was the reason given by the editor for her appointment. Mrs. Sanders' first feature was sold less than four months after she enrolled with N.I.A.

Why can't you write?

It's much simpler than you think!

So many people with a "germ" of writing in them simply can't get started. They suffer from inertia. Or they set up imaginary barriers to taking the first step.

Many are convinced the field is confined to persons gifted with a genius for writing.

Few realize that the great bulk of commercial writing is done by so-called "unknowns." Not only do these thousands of men and women produce most of the fiction published, but countless articles on business affairs, social matters, domestic science, etc., as well.

Such material is in constant demand. Every week thousands of checks for $25, $50 and $100 go out to writers whose latent ability was perhaps no greater than yours.

The Practical Method

Newspaper work demonstrates that the way to learn to write is by writing! Newspaper copy-desk editors waste no time on theories or ancient classics. The *story* is the thing. Every copy "cub" goes through the course of practical criticism—a training that turns out more successful authors than any other experience.

That is why Newspaper Institute of America bases its writing instruction on the Copy-Desk Method. It starts and keeps you writing in your own home, on your own time. And upon the very same kind of *actual assignments* given daily to metropolitan reporters. Thus you learn by *doing*, not by studying the individual styles of model authors.

Each week your work is analyzed constructively by practical newspaper men. Gradually they help to clarify your own *distinctive style*. Writing soon becomes easy, absorbing. Profitable, too, as you gain the "professional" touch that gets your material accepted by editors. Above all, you can see constant progress week by week as your faults are corrected and your writing ability grows.

Have You Natural Ability?

Our Writing Aptitude Test will reveal whether or not you have natural talent for writing. It will analyze your powers of observation, your imagination and dramatic instinct. You'll enjoy taking this test. There is no cost or obligation. Simply mail the coupon below today. Newspaper Institute of America, One Park Avenue, New York, N. Y.

Free

Newspaper Institute of America
One Park Avenue, New York

Send me, without cost or obligation, your Writing Aptitude Test and further information about writing for profit as promised in Nature, May.

Miss }
Mrs. }
Mr. }

Address .....

(All correspondence confidential. No salesman will call on you.) 87E598

Among Our Authors

A. Dawes DuBois (At Home with the Pewee) is an electrical engineer who was educated at the University of Illinois and Cornell, but who finds the fields of ornithology and photography equally alluring. He has homesteaded in the west, worked as a forest ranger, taught electrical engineering, and was at one time connected with the Illinois State Museum of Natural History.

Clair A. Brown (Marihuana) is associate professor of botany at Louisiana State University and is making a study of Louisiana plants and their distribution. He has published a series of articles on Louisiana wild flowers, and a National Park Service bulletin on the ferns and flowering plants of Isle Royale.

G. B. Mitchell (Thrills in the Wild) is a New York advertising executive who has, during the past twenty-five years, spent many months in the Canadian Rockies. He hunts with a motion picture and still camera, and with drawing pencil, and lectures now and then. An honorary member of one Indian tribe, he has been given the name O'has-zena-na, which, he says, makes him feel as though he had a family of 700 to support, besides his immediate family.

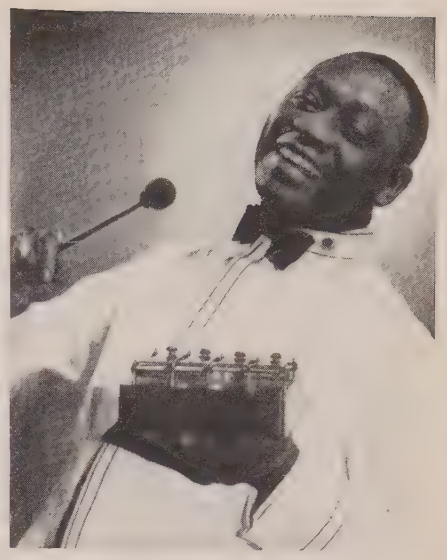
Maud Macdonald Hutcheson (Britain's Money Goes Modern) claims Scotland as her "native heath", Canada as a land of adoption and Washington, D. C., as an enriching experience. She free-lances for magazines and newspapers in the British Isles, Canada and the United States.

Margaret E. Gross (The Bird that Adopted Michigan) is secretary of the Michigan Audubon Society; **John Lindsey Blackford** (Woodland Moments) is a young Montanan with a love of the outdoors and a gift for telling about it; **Don Bloch** (Men Who Have Given Their Names) is a newspaperman and free-lance writer, formerly a publicity writer with the Biological Survey; **Joseph S. Dixon** (Retracing Muir's Steps) is well known as an ornithologist of wide experience, and is now field naturalist of the National Park Service.

A Robin Incident

By Lillian Chalmers

Last spring a pair of robins built a nest in a tree just beyond the roof of a porch in front of my window where we could watch them nicely. In due time there were eggs and then, in due course, two little birds. After a while the two little birds flopped about and seemed to try to throw themselves from the nest, but were apparently held back by something. One of them got over the edge and hung there; then both of them went over and to the ground. We picked them up and found that two of their legs were fastened together, the right of one to the left of the other, by grass and a string wound round and round. One leg was cut into quite a bit by the string and was sore. We cut the binding and the better bird hopped away and we never caught it again. The other was too lame to hop away so we put it into a shallow box. That did not work for it hopped out and a cat would have gotten it in no time. So we put it into a box deep enough to keep it there and put the box on the porch roof. There the parents found it and fed it for two days, when it flopped out and flew to the ground. We hoped thereafter that it was faring well but about a week later we found it dead.



SWEET MUSIC ..en route

TRAVEL BY TRAIN NORTHERN PACIFIC YELLOWSTONE PARK LINE

Chimes invite you to dinner aboard the North Coast Limited. From the delicious "Great Big Baked Potatoes"... a famous Northern Pacific specialty...through the great variety of tempting dishes, always reasonably priced . . . dining car meals on the Northern Pacific Railway are a real pleasure. They are a perfect accompaniment to the glorious scenery along the route—28 mountain ranges and rivers for 1408 miles. Write us or mail the coupon for information on Western trips.

Northern Pacific Railway

E. E. Nelson
192 Northern Pacific Railway, St. Paul, Minn.

Send me information, please, on: *(Check data desired)*
☐ Pacific N.W. ☐ Rainier Park ☐ Rocky Mt. Dude Ranches ☐ California ☐ Yellowstone Park ☐ Alaska ☐ Escorted Tours ☐ Independent Trip

*Name*_____
*Address*_____
*City*_____ *State*_____
*If student, state grade*_____

ROUTE OF THE AIR-CONDITIONED
NORTH COAST LIMITED

Photographic Notes

BY SAMUEL BROWN

Animals

Spring introduces a wealth of Nature picture opportunities. Flowers are blossoming, and many birds and mammals are engaged in activities that make excellent subject matter for our cameras. Even the city dweller may find ready subjects in the zoo, and, in most cases, these may be freely photographed. For the amateur who wishes to do a more unusual type of photography, taking pictures of small animals at night in their quest for food is a field of action that requires skill and patience.

Most present-day zoos have the animals living as nearly under natural conditions as possible, and many surprisingly natural pictures can be made when the proper point of view is chosen. Animals should not be photographed looking directly at the camera, but engaged in some interesting activity, such as feeding or playing with their companions.

It is suggested that a high speed Panchromatic film be used in order to allow fast shutter speeds so that all action can be stopped. On a bright day, a fine grain film is preferred, because big enlargements can then be made. Shutter speeds of at least 1/50 of a second should be used, and faster when the light permits.

For the amateur who would like to take pictures of animals at night in their natural habitats, there are several devices that are especially suitable for this purpose. These are synchronizers, which make an electrical contact and open the shutter and flash a bulb at the same time.

This is arranged so that a slight pressure on a string attached to the release will get the picture. Where such a device is used, a piece of bait is attached to the end of a string, reaching to the synchronizer and camera. When the animal comes to claim his meal, he will automatically set off the flash, making his own picture. In setting up the camera, it should be carefully covered so that no moisture can reach it, and secured in position so that it will not be overthrown by passing animals.

Daylight pictures of similar character are somewhat more easily made. The same arrangement as described above may be used, but with the thread attached to the shutter release, and when the chipmunk or rabbit starts gnawing at the food, he will set off the shutter. The camera should be carefully focused for the proper distance, and set for the correct aperture and shutter speed.

If your quarry is a squirrel, some nuts are sure to attract him, while most other mammals will be delighted with a meal of meat. When setting up the camera, the best point of view should be chosen so that the background will be in harmony with the subject. A story-telling series of pictures is helpful in showing the life habits of our birds and mammals. Such a series might be made, beginning in the spring, and following through their activities in the summer.

ONE OF OUR READERS, JOHN J. PORTER, SET THIS CAMERA TRAP FOR THE OPOSSUM TO TAKE HIS OWN PICTURE. MADE WITH A NESBIT FLASHLIGHT OUTFIT AND WEATHER-PROOF CAMERA WITH 1/200 OF A SECOND EXPOSURE AT F6.3

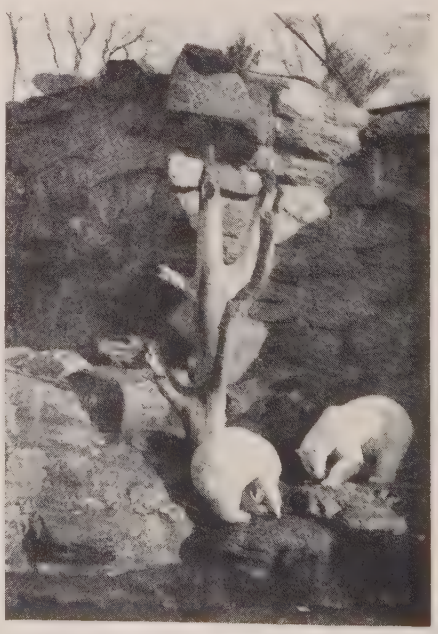
Visitors to our National Parks find excellent subjects in the wild. Most of these have become relatively tame because of their protection in these areas. They may therefore be approached quite closely and intimately photographed.

Where it is desired to lend an artistic note —which may easily be done in some zoos and with tame animals—it is effective to include some sky in the picture, darkening it with a filter. The clouds will thus stand out. If possible, taking a picture between two trees will give a natural frame to the picture and make it more attractive.

In all instances where animals are photographed, the faster the shutter speed used the more likely is the picture to be sharp. Animals are likely to move suddenly, and only fast shutter speeds will stop their motion.

High speed film such as Superpan or Supersensitive Panchromatic is most desirable, because they will take most advantage of the available light. For bright light, such as is generally found in the wide open spaces, slower film such as Panatomic or Finopan are ideal. Fast Orthochromatic films are also useful in daylight. When developing the films on which animal portraits have been made, a fine grain soft working developer is best. This will assure the greatest detail, which is essential in pictures of mammals.

Besides being a delightful activity, animal pictures offer the amateur ideal subjects because of the naturalness of their posing. Working with subjects of this kind requires considerable patience, skill and effort, but when the pictures are finished they are worth all the time and work necessary to get them.



PHOTOGRAPH OF BROOKLYN ZOO POLAR BEARS BY JOSEPH PULITANO. 1/100 OF A SECOND AT F5.6

* * *

Printing

After films have been developed, comes the delightful occupation of making the prints. Making prints may at first seem like a huge undertaking, but is actually simple, requires a minimum amount of equipment, and offers much fun, pleasure and profit in the pictures that result.

Although a dark room that can be set aside and used specifically for photographic work is most desirable, any room that can be made dark for a few hours, such as a reasonably large closet, a garret room, or even a kitchen, after the family has left it, will serve admirably. At night, nearly any room is sufficiently dark when the light is turned off.

The essential equipment for print making will include, besides the dark room, a suitable safe light, sensitized paper, developing and fixing solution, a printing frame or amateur printer, which may be purchased or built at home, trays and blotters. Some additional items such as a graduate, stirring rod, thermometer, ferrotype tins, a clock with a sweep second hand, and a set of scales will permit wider application.

It is necessary that the safe light should be of a color under which it is easy to work and yet allow the maximum amount of light to be used. For contact printing, this may be either bright red, or deep yellow. A white light should be conveniently placed so that it will be about 12 to 24 inches above the

Your Child will find new interests, new health at the Top of the Poconos

Consider these outstanding advantages — for your child, for yourself—of a vacation at Pocono Manor! Here, at the top of the unspoiled Pocono Mountains, is the perfect setting for joyous good times and healthful fun for all the family.

1. 3,000-acre woodland estate, with hundreds of species of birds, wild flowers, plants and trees.
2. Children's playground, playhouse, splash pool, camp. Expert supervision relieves parents of daytime responsibility.
3. Supervised courses in nature study, Indian lore.
4. All healthful outdoor sports, safely enjoyed.
5. Pocono Manor School of progressive education. Also classes in outdoor sketching and painting.
6. Modern, fireproofed Inn; entertainment and social program. Chamber music; dance orchestra.
7. Good roads for touring; accessible to all Eastern cities by main concrete highways; 100 miles from Philadelphia and New York.
8. Physician with daily office hours, registered nurse in residence; Post Office; Western Union; drug store; gift shop.

Write today for full information and rates, mentioning NATURE MAGAZINE and ages of children. Special folder. Herman V. Yeager, General Manager.

POCONO MANOR INN

Pocono Manor—Pennsylvania

N. Y. OFFICE: 522 Fifth Avenue
VAn. 3-7200

Wear a Buddy Poppy on Memorial Day

A copyright green label guarantees each Buddy Poppy as the handiwork of disabled ex-service men in government hospitals.

All proceeds of the Sale are used for relief and welfare work among needy veterans and their families, including an allotment to the V. F. W. National Home for Widows and Orphans of Ex-Service Men, in Michigan.

VETERANS OF FOREIGN WARS
OF THE UNITED STATES

KEEP FAITH WITH THEM

table on which you will work. This light is solely for making exposures on the paper, and should be so placed that it will be the same distance from the printing frame at all times. In this way, exposures will always be consistent and accurate exposure times determined. A frosted 60-watt Mazda bulb is best for this purpose.

A printing frame is a device that has much the appearance of a picture frame. The back is easily removable and is generally hinged. When put in place, it is locked by means of two heavy springs that give even pressure between the glass and back. The printing frame should be as large as the largest print to be made. A suitable, commercially-made printing frame is one that permits the masking of the print in the frame, and consists generally of two fixed metal borders along the top and one side, and two movable borders to make the lower and second side borders. In this type of printing frame, the negative is held securely and an even margin assured around the edge of the whole print. With this frame, it is possible to make any number of uniformly masked prints without changing the position of the negative.

Three trays of enamel, glass or hard rubber, are required for developing. Two of these should be somewhat larger than the largest print to be made, and the third should be about twice this size. One of the smaller ones is used for the developing solution, the second for the rinse, or short stop bath, and the larger one for the fixing solution.

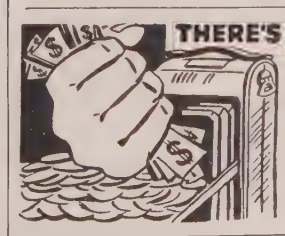
Good, chemical-free blotters are required in order to remove the excess water after the prints are washed. When glossy pictures are made, the ferrotype tins assure a brilliant glossy print. There are two solutions required for printing. The first of these is the developer, which it is suggested be bought already made up and which requires only the addition of water. The fixing bath may be purchased in the same way. When using, these solutions are diluted to the strength required. For persons making prints only occasionally, the more handy idea is to purchase a number of M. Q. tubes, each of which will make eight ounces of ready-to-use developer. Acid fixing bath may be purchased in the same form with all the necessary chemicals already mixed. This is dissolved as directed on the carton and may be used as required.

(To be continued)

Trade Hints and New Books

At Home With Your Kodak is the new edition of an already popular booklet. It deals with various photographic activities in and around the home, and discusses methods of

(Continued on page 261)



THERE'S MONEY IN YOUR CAMERA!

Others make good incomes selling pictures to publications. FREE BOOKLET describes home-study course (which may be paid for in easy installments).

Universal Photographers, Dept. 235, 10 West 33 Street, N. Y. C.

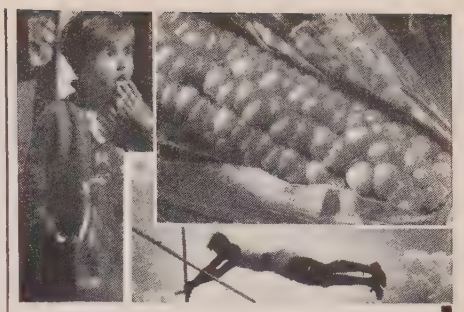
TAKE PICTURES for Pleasure & Profit

FREE CAMERA CATALOG

Be a camera expert. You can make prize winning pictures. Do your own finishing and enlarging. Send for this big free catalog of cameras, supplies.

Write Today for Catalog No. 238-A

BURKE & JAMES, Inc.
223 W. Madison St. • CHICAGO, ILL.



LEICA—The Camera for all purposes

The Leica owner who wishes to specialize in stereophotography, photomicrography, photomacrography, telephotography, etc., can do so with ease for his Leica is designed for instant adaptation to every photographic endeavor.

The microscopic precision of the Leica, its 12 interchangeable lenses and over 400 accessories, give it the versatility which has earned for it the title of the UNIVERSAL CAMERA.

Ask your dealer about the Leica Time Payment Plan or write for full information.

THE ORIGINAL MINIATURE CANDID CAMERA

Model G with Leitz Xenon f:1.5 Speed Lens and Rapid Winder

DEPT. 68
E. LEITZ, INC., 730 FIFTH AVE., N.Y.

An All-Year VACATION

Sights and Scenes in

CALIFORNIA · COLORADO

—will delight you with their memories until your next vacation—and longer.

YOSEMITE
YELLOWSTONE
ROCKY MOUNTAIN
CARLSBAD CAVERNS

The big four of western National Parks in one circle trip via the de luxe **Golden State Limited** or the Economy-Luxury **Californian** Chicago to California—**Rocky Mountain Limited** to Colorado. All trains air-conditioned — low Summer fares.

Ask About Economy All-Expense Tours

Rock Island — Rock Island

W. J. LEAHY, Passenger Traffic Manager
Rock Island Lines
712 La Salle Street Station, Chicago, Ill.

Please send me complete information about:

..... ☐ All-Expense Tours

Name .....

Address .....

City ..... State 2391-4

NATURE MAGAZINE

PUBLISHED BY THE AMERICAN NATURE ASSOCIATION

To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

IN THIS ISSUE

Photographic Notes	Samuel Brown	258
Indoors and Out	Howard Zahniser	263
Woodland Moments	John Lindsey Blackford	265
Shower (Poem)	Lawrence R. Holmes	268
A Miniature Evergreen Vine	Victor H. Ries	268
At Home with the Pewee	A. Dawes DuBois	269
Ash-Throated Flycatcher	Sam and Gladys Knight	270
Marihuana	Clair A. Brown	271
Spring in Tennessee (Poem)	Helen Lilienthal	272
Thrills in the Wild	G. B. Mitchell	273
Britain's Money Goes Modern	Maud MacDonald Hutcheson	277
Wading in the Pool (Poem)	Margaret Tynes Fairley	279
The Coffee Tree	William M. Harlow	279
Men Who Have Given Their Names	Don Bloch	280
The NYA and Conservation	Horace L. Poole	284
The Magic Moth	Edith M. Laing	286
Retracing Muir's Steps	Joseph S. Dixon	287
The Seahorse		292
Aardvark—God of Evil	Ernst Schwarz	292
Conservation		293
The Rising Tide of Floods	Henry H. Collins, Jr.	295
The Ingenious Carpenter Bee	S. F. Aaron	299
Naturalist's Lament (Poem)	Barbara Schmitt Whitney	300
The Bird that Adopted Michigan	Margaret E. Gross	301
Things to Think About		303
Woman's Tongue Tree	Hugo H. Schroder	304
A Solid, if Not Toothsome, Plateful	George A. Smith	304
Moon to Be Eclipsed in May	Isabel M. Lewis	305
Teachers!	Paul M. Deller	307
Menelik's Bushbuck	Ernst Schwarz	308
The School Page	E. Laurence Palmer	310
Under the Microscope	Julian D. Corrington	312
The Bull Terrier	Diana Thorne	317

NATURE MAGAZINE, PAST AND PRESENT, IS INDEXED IN THE READER'S GUIDE IN YOUR PUBLIC LIBRARY

U. S. AND CANADA
ONE YEAR.....$3
FOREIGN...$1 EXTRA
TWO YEARS.....$5
LIFE $100

A. B. McClanahan, Advertising Manager

ADVERTISING OFFICES
New York—295 Madison Avenue
Washington, D. C.—1214 16th St.
Chicago—203 N. Wabash Ave.
Los Angeles—Western Pacific Bldg.
San Francisco—Mills Bldg.

NATURE MAGAZINE is published ten times each year by the American Nature Association. Entered as second-class matter May 31, 1927, at the post office at Washington, D. C. Additional entry at Greenwich, Conn.

Publication and Editorial Office, 1214 16th Street, N. W., Washington, D. C. Additional Office of Publication, Greenwich, Conn.

Copyright, 1938, by American Nature Association

Title Registered U. S. Patent Office

THE ASSOCIATION

ARTHUR NEWTON PACK.....President
Abiquiu, N. M.

RANDOLPH G. PACK.....Vice-President
Darien, Conn.

RICHARD W. WESTWOOD.....Secretary
Washington, D. C.

JAMES A. O'HEARN.....Treasurer
New York, N. Y.

HARRY E. RADCLIFFE.....Business Manager
Washington, D. C.

WILLIAM L. FINLEY.....Field Naturalist
Route 10, Portland, Ore.

DR. E. LAURENCE PALMER.....Director, Nature Education
Cornell University, New York

THE MAGAZINE

ARTHUR NEWTON PACK.....Editor

RICHARD W. WESTWOOD.....Managing Editor

EDWARD A. PREBLE.....Associate Editor

R. BRUCE HORSFALL.....Artist

HARRY E. RADCLIFFE.....Business Manager

SCIENTIFIC CONSULTING BOARD

DR. LELAND O. HOWARD
Retired Chief, U. S. Bureau of Entomology

DR. WALDO L. SCHMITT
Curator of Marine Invertebrates, U. S. National Museum

DR. HARRY C. OBERHOLSER
Senior Biologist, U. S. Biological Survey

W. L. McATEE
Technical Adviser, U. S. Biological Survey

C. W. GILMORE
Curator of Vertebrate Paleontology, U. S. National Museum

VERNON BAILEY
Retired Chief Naturalist, U. S. Biological Survey

DR. PAUL BARTSCH
Curator of Mollusks, U. S. National Museum

DR. EDGAR T. WHERRY
Wild Flower Preservation Society

DR. WILLIAM M. MANN
Director, National Zoological Park

WHERE-TO-GO

1906

Featured every month in 32 or more publications. Approximately One Million circulation.

Please send information re.....

I plan my trip about.....

Name.....

Address.....

1938

Hotels — Resorts and Travel. For complete data — or rates in our department write to

THE WHERE-TO-GO BUREAU, Inc., 8 BEACON STREET, BOSTON, MASS., U. S. A.

TRAVEL

A *New* Travel World

NEWFOUNDLAND!

Unspoiled . . . uncrowded . . . uncommon! Explore this wild, wooded Island of majestic forests and fjords—quaint, cliff-side fishing villages. Sail, canoe, play golf—and cast for "40-pounders" in salmon rivers, lakes, streams. Modern camps, hotels, at low rates.

Write for free booklet "Come to Newfoundland" to Newfoundland Information Bureau, Dept. F, 620 Fifth Avenue, New York, N. Y., or Newfoundland Tourist Development Board, St. John's, Newfoundland, or any travel agency.

VERMONT

THOSE GORGEOUS GREEN MOUNTAINS

ASK

for new, handsomely-illustrated free booklet, "Unspoiled Vermont." A thrilling preview of your 1938 vacation-tour. Scores of eye-filling scenes such as greet you at every turn of the road in this land of mountains, lakes and valleys, gorgeous greenery and famous hospitality. Varied country fun for all the family—described in this free book. Write VERMONT PUBLICITY SERVICE, 27 STATE HOUSE, MONTPELIER, VT.

VERMONT

Remember—small copy is BIG in Where-To-Go

TRAVEL

LABRADOR

11-12½ Days - $135 up

See LABRADOR . . . in ocean liner comfort! Land of mystery - The Golden North and romantic French Canada, beautiful Newfoundland—on CLARKE luxury cruises from Montreal. Ask your Travel Agent or

CLARKE STEAMSHIP CO. LTD.
CANADA CEMENT BLDG., PHILLIPS SQ. - MONTREAL, CANADA

M. . . BICYCLE . . . C

O through "Unspoiled Europe." Small groups **A**
for students and teachers in company of **N**
European students. See much more and **O**
spend much less. 10 wk. all-inc. trips inc. **E**
steamer from $298. General and specialized
trips available. Write for free booklet W.
SITA, 11 West 42nd St. (at 5th Ave.), N.Y.

Our advertisers waste no money in presenting their invitations to people who cannot accept. Always advertise as widely as you are able.

NEW YORK

Supreme
in the arts of hospitality
and entertainment

THE
WALDORF-ASTORIA
Park Ave. • 49th to 50th
New York

HOTEL SEYMOUR 50 W. 45th St. Near Fifth Ave., N. Y. C., theatres, shops, art galleries, Radio City. Quiet refined surroundings. Single $3.50 up; double $5.00 up.

Where-To-Go publicity covers N. America

CRAGSMOOR INN on mtn. top 75 mi. north of N. Y. C. Select clientele. Delicious meals. Tennis. Golf. Swimming. Booklet. Cragsmoor, N. Y.

When writing to these advertisers will you please mention The Where-to-go Bureau?

Air-Conditioned

OREGON

● Land of cool nights, sunny exhilarating days. A new unspoiled vacation state of mountains, ocean beaches, forests, lakes, streams. Send for free 28-page booklet. Oregon State Highway Commission, Travel Dept. Room 72, Salem, Oregon.

WRITE FOR BOOKLET

COLORADO

COLORADO DUDE RANCH ASS'N .....
offers Western vacation for adults and families. . Ranch-Camps for boys and girls. For information write to COLORADO SPRINGS, COLORADO.

Where-To-Go for June closes April 29

CANADA

Try BRITISH COLUMBIA
CANADA—THIS SUMMER!
Write for Literature to
BUREAU OF INDUSTRIAL AND TOURIST DEVELOPMENT, VICTORIA, B.C.

SEE *Pennsylvania* THIS YEAR!

● Spring, Summer, Fall or Winter Pennsylvania is a traveler's paradise! Whatever you want—superb mountain scenery, lakes, deep forest, top-notch hunting and fishing, historic interest—they're all here, served by 30,000 miles of fine highways. Write Dept. B, Pennsylvania State Publicity Commission, Harrisburg, Pa., for your Hospitality Passport, also Map and Travel Guide.

PHOTOGRAPHIC NOTES

(Continued from page 259)

photographing the subjects around us. Photographing children, the home, the garden and pets are only a few of the subjects discussed. Write to this department for your free copy, enclosing a three-cent stamp for postage.

Carl Zeiss, 485 Fifth Avenue, New York, N. Y., announces the new model Super Ikonta B. In this new model the range-finder and view-finder have been combined in a single large opening. Accurate finding and focusing thus become a single operation. The superimposed type of range finder is an integral part of the camera and assures needle-sharp pictures at all times. Space does not permit a complete discussion of the many additional features, but a note to Carl Zeiss will bring a prompt reply together with descriptive literature. Please mention Nature Magazine.

* * *

In the March issue, there appeared in this department an illustration entitled "Some Friends of the Woods". The caption neglected to give the name of the author, "Harold M. Holland", who explains that the correct data are as follows: Verichrome film, at F 8, exposure 1/160 second with 4x5 R.B. Auto Graflex.

* * *

An especially gratifying piece of news comes from the Folmer Graflex Corp., Rochester, N. Y., for many years the acknowledged leader in the manufacture of Speed Graphic cameras so long the accepted official camera for newsmen. The Graflex Co. announce the award of five diamond-studded gold watch charms to the authors of the five outstanding news pictures of the year. This award will surely be an incentive to all news photographers.

* * *

The photographic department of Nature Magazine is edited for its readers interested in photography and maintains a service that renders assistance with any photographic problem. You are invited to take advantage of this service. Address all photographic inquiries to Samuel Brown, Nature Magazine, 1214 Sixteenth St., N.W., Washington, D. C.

Cordially,
SAMUEL BROWN

Nature Photography

Nature Photography Around the Year is the title of a new book, much-needed in this field, by Percy A. Morris of the Peabody Museum of Natural History of Yale University. This volume is what the title suggests, but, in our estimation, it is more than that. Taking the year month by month, the author suggests a wide variety of photographic activities that may be followed, and includes technical suggestions in connection therewith. But he doesn't stop there. He gives us a well-written and entertaining picture of the outdoors during the month with which he treats. His book can, therefore, be read for its Nature information and for suggestions as to what one might observe without the camera as well as with it. Such treatment of his subject is different from that of any comparable book we have seen, and, in addition, Mr. Morris' book is far and away the best-written book on photography that we have read. Liberal illustrations, drawn from the author's own large stock of Nature negatives supplement the text; there is a good bibliography and index. The book is a credit to Mr. Morris and to his publishers, D. Appleton-Century. The book sells for four dollars.

THE BIGGEST TELEPHONE VALUE FOR YOUR MONEY

Nowhere in the world do people get so much for their telephone money as in America. No other people get so much service and such good service at such low cost.

BELL TELEPHONE SYSTEM

AMERICAN TELEPHONE & TELEGRAPH CO. AND ASSOCIATED COMPANIES — BELL SYSTEM

Indoors and Out

By HOWARD ZAHNISER

Where shall we keep the holiday,
And duly greet the entering May?

RALPH WALDO EMERSON, who proposes the query, has an answer that perpetuates the question by implying that anywhere in the outdoors is a suitable place in May. Instead of a place, however, he seems to suggest a route, for his "up and away" is to woods and hills and streams and crags and plains. Certainly it is a time to be out and not indoors. Yet next to taking a trip I enjoy most a map of the route; next to seeing a place *with* my eyes I enjoy most seeing it *through* my eyes. And often the lesser joy enriches the greater, whether it precedes or follows. If I know my own mind, it is for some such reason as this that I think of reading Emerson in May.

Indoors in May one can hardly help but feel a sublime discontent with any dwelling place that shuts out the world of wildness. It is a fine thing then to have a "king's treasury" to draw upon, and it is the peculiar richness of a library that one can find there whatever he needs for the moment or season. Surely he can find Emerson there, and surely Emerson will transport him quickly to the out-of-doors.

On one May day Emerson wrote in his journal: "I remember when I was a boy gazing upon the beach and being charmed with the colors and forms of the shells, I picked up many and put them in my pocket. When I got home I could find nothing that I gathered—nothing but some dry ugly mussel and snail shells." But in Emerson's books I myself can find what he gathered—and it will be 135 years the twenty-fifth of this May since he was born, 56 years the twenty-seventh of April since he died. When a man has gathered for books as faithfully as Emerson has by going—

. . . to the god of the wood
To fetch his truth to men,

his readers know what Ruskin meant when he called libraries "king's treasuries."

On another day in May Emerson wrote: "Yesterday in the woods I followed the fine humble-bee with rhymes and fancies free." Now any time—

When the south wind, in May days,
With a net of shining haze
Silvers the horizon wall,

I can reach for my volume of Emerson's poems and follow the—

Yellow-breeched philosopher!
Seeing only what is fair,
Sipping only what is sweet.

Again in May, Emerson found "the fresh Rhodora in the woods", and I can still see how—

The purple petals, fallen in the pool,
Made the black water with their beauty gay.

And, what is perhaps more, I can again have the simple assurance—

. . . that if eyes were made for seeing
Then Beauty is its own excuse for being.

I have never seen the Musketaquid, but with Emerson's verses I know more about it than I would had I looked at the river with only my own eyes as—

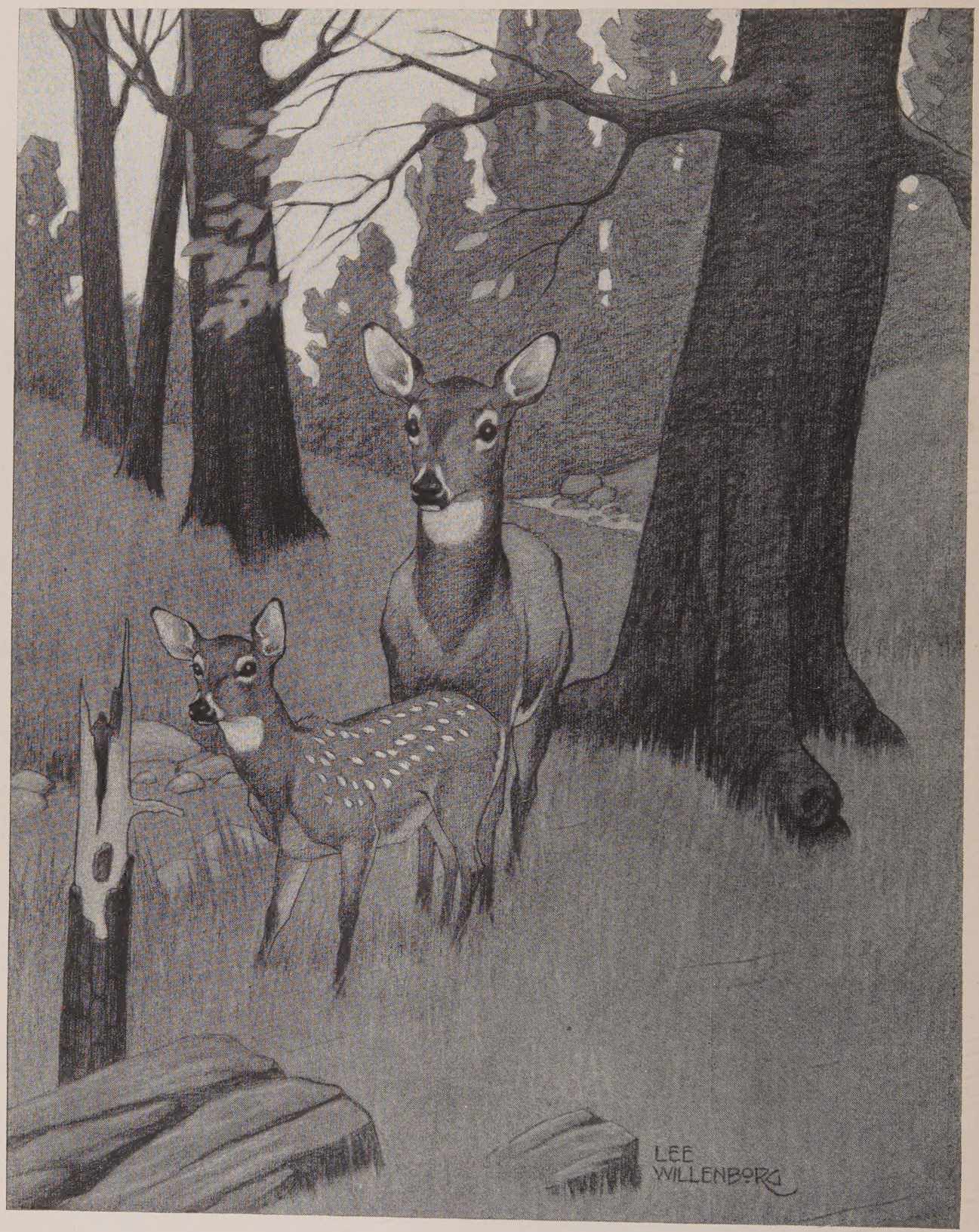
Onward and nearer rides the sun of May;
And wide around, the marriage of the plants
Is sweetly solemnized.

Emerson's verses have not always the overtones of poetry, though the undertones are there. Often his poems show a lack of skill in versifying. Many of the metrical feet and rhymes did not come easily born from Emerson's mind. They had instrumental deliveries, and show the distortions that often accompany such births. Yet they are new creations of a great mind, begotten of faithful observation and earnest meditation. They have life. They are revelations. Their virtues are inherent and essential. Their defects are incidental. None can neglect these poems without sacrificing some of the advantages of having entered the world after it had been so enriched.

I am interested for the moment in Emerson's poetry and not his prose, for the simple reason that it is enough for the present. I have further limited myself because my interests now are in the tangible world of Nature that springs to growth in May. I have quoted from "The Humble-Bee", "Rhodora", and "Musketaquid", and the opening "motto" (used in an Emersonian (Continued on page 309)

To bring it into conformity with the majority of publications in the educational field, *Nature Magazine* will, beginning next month, be published on a basis of ten issues a year. This step will also facilitate the rounding out of the educational program of the American Nature Association through the publication of the Association's *Quarterly Bulletin,* which is available to members of the Association and subscribers to the Magazine on request. Other projects are in the process of perfection and will be announced later in these pages.

The next issue of *Nature Magazine* will, therefore, be the June-July issue, and will be in circulation on June 2, about two weeks later than usual. The August-September issue will, correspondingly, appear August 2. The magazine will also adopt a ten-issues-to-the-volume basis, the current Volume 31 continuing through to December, 1938. The index will appear annually in the December issue.



"DOWN ONE OF THOSE WINDING AISLES THERE CAME, LEISURELY BREASTING THE TALL AND WAVING GRASSES, A DOE AND SPOTTED FAWN."